



# **Groundwater Monitoring Report Fourth Quarter 2018 Sampling Event SWMU 33 - Nail Mill Degreasing Area**

**Former AK Steel Kansas City Facility**

**EPA ID MOD 007 118 029**

**Ross Custom Properties  
Project No. 106603**

**March 2019**



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Project No. 106603**

**March 2019**

prepared by

**Burns & McDonnell Engineering Company, Inc.  
Kansas City, Missouri**

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## LIST OF ACRONYMS

<b><u>Abbreviation</u></b>	<b><u>Term/Phrase/Name</u></b>
4 <sup>th</sup>	Fourth
ALS	ALS Global of Houston, Texas
Burns & McDonnell	Burns & McDonnell Engineering Company, Inc.
DCE	dichloroethene
DO	dissolved oxygen
ft	feet
LTM	Long term monitoring
LTM Plan	<i>Long Term Monitoring Plan for SWMU 33, Nail Mill Degreasing Area, Former AK Steel Kansas City Facility</i>
MCL	Maximum Contaminant Level
MCS	media cleanup standard
µg/L	micrograms per liter
MNA	monitored natural attenuation
MPS	Multiparameter System
ORP	oxidation reduction potential
QA	quality assurance
QC	quality control
RCP	Ross Custom Properties
RCRA	Resource Conservation and Recovery Act
RSL	USEPA Regional Screening Level Table (November 2018)
SWMU	solid waste management unit
TCE	trichloroethene
TOC	total organic carbon
U	qualified as undetected
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

## **DOCUMENT DISTRIBUTION**

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## 1.0 INTRODUCTION

Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) has prepared this Groundwater Monitoring Report on behalf of on behalf of Ross Custom Properties (RCP) to support groundwater long term monitoring (LTM) activities at Solid Waste Management Unit (SWMU) 33, Nail Mill Degreasing Area, at the Kansas City, Missouri Facility during the fourth (4<sup>th</sup>) quarter of 2018.

### 1.1 Purpose and Scope

The purpose of this Groundwater Monitoring Report is to present details of the 4<sup>th</sup> Quarter 2018 Sampling Event conducted at the SWMU 33, Nail Mill Degreasing Area at the RCP in Kansas City, Missouri. Groundwater monitoring activities included LTM sampling for volatile organic compounds (VOCs) and monitored natural attenuation (MNA) parameters as outlined in the *Long Term Monitoring Plan for SWMU 33, Nail Mill Degreasing Area, Former AK Steel Kansas City Facility (LTM Plan)* (Burns & McDonnell, 2018).

### 1.2 Groundwater Monitoring Report Organization

This Groundwater Monitoring Report has been prepared by Burns & McDonnell and consists of one volume. This document is organized as follows:

- Section 1.0 – Introduction
- Section 2.0 – Field Activities Summary
- Section 3.0 – Hydrogeology
- Section 4.0 – Analytical Results
- Section 5.0 – Summary and Conclusions
- Section 6.0 – Report Limitations
- Section 7.0 – References
- Tables
- Figures
- Appendices (provided electronically on CD)
  - Appendix A – Field Logbook and Monitoring Well Sampling Field Data Sheets
  - Appendix B – Analytical Data for 4<sup>th</sup> Quarter 2018 Sampling Event
  - Appendix C – Data Validation Report for 4<sup>th</sup> Quarter 2018 Sampling Event
  - Appendix D – Groundwater VOC Results for All Events

### 1.3 Facility Location

The defined Resource Conservation and Recovery Act (RCRA) Facility is located in northeast Kansas City, Missouri within the Blue River and Missouri River floodplains. Portions of the RCRA Facility are located both east and west of Interstate Highway 435 (Figure 1-1). Industrial activities were historically performed in the area west of I-435, north of 12th Street, and east of Ewing Avenue (Figure 1-2).

Manufacturing associated with SWMU 33, Nail Mill Degreasing Area, was located west of I-435 and the Blue River, north of Independence Avenue/24 Highway. The area that includes SWMU 33 is currently owned by RCP.

The current physical address for the area that includes SWMU 33 is:

7000 Winner Road  
Kansas City, Missouri 64125.

### 1.4 SWMU 33 Background Information

The Nail Mill Degreasing Area (SWMU 33) was used for the removal of residue during the production of nails. The degreasing operation was in the northwest portion of the Nail Mill (Figures 1-2 and 1-3). The presence of chlorinated VOCs in the surrounding area was discovered and reported in 1991 while Armco was preparing for the closure and conversion of the mill into a warehouse. The nail mill was subsequently demolished, and a wood floor contaminated with trichloroethene (TCE) was removed and properly disposed. In 2017, interim soil removal from the location of the former degreasers was completed. Approximately 3,320 tons of soil and concrete/slag was removed from the former degreaser area and disposed as Special Waste. The excavation was backfilled with slag that was mined from an area north of the excavation. The top 1 foot of the area was surface finished with MODOT Type 5 aggregate. Background information regarding geology and hydrogeology for the area surrounding SWMU 33 was presented in Sections 2.5 and 2.6 of the *RCRA Facility Investigation Report, Armco Kansas City Facility* (Burns & McDonnell Waste Consultants, Inc., 1999). A summary of environmental investigations and remedial actions performed at SWMU 33 is provided on Table 1-1.

### 1.5 Contaminant Distribution in Groundwater

Chlorinated VOCs are present within the groundwater at SWMU 33 as a result of historical activities at the nail mill degreasing area. During prior investigations, monitoring wells were installed to monitor the upper shallow portion of the aquifer, the lower portion of the aquifer, and in areas where a semi-confining layer is present, the intermediate portion of the aquifer. Past investigations have shown that the chlorinated VOCs in groundwater are centered around historical Well Cluster 33MW2S (shallow),

33MW2 (intermediate), and 33MW3R (deep). Soil samples collected within this area also contained high levels of chlorinated VOCs. In 2017, the soil in this area was excavated.

The groundwater gradient within the area of SWMU 33 for both upper and lower portions of the aquifer is radially northwest to northeast (Appendix B, LTM Plan). For the shallow portion of the aquifer, a groundwater high to the west of SWMU 33 controls the groundwater flow into this area. Chlorinated VOCs are present in both the upper and lower portions of the aquifer; however chlorinated VOCs within the lower portion of the aquifer are lesser in concentration and areal extent. VOCs that exceed the media cleanup standards (MCSs) are limited to the central portion of the plume. Concentrations of chlorinated VOCs have in general decreased over time (Appendix D). With the removal of the chlorinated VOC-impacted vadose zone soils, it is likely that chlorinated VOC concentrations in groundwater will continue to decrease.

\* \* \* \* \*

## **2.0 FIELD ACTIVITIES SUMMARY**

Burns & McDonnell field personnel conducted the groundwater sampling event from December 3 through 5, 2018. Field activities conducted during the event included: monitoring well inspections; water level and total depth measurements; monitoring well purging using low-flow techniques; collection of field measurements of temperature, pH, specific conductance, turbidity, dissolved oxygen (DO), and oxidation reduction potential (ORP); and collection of groundwater samples.

### **2.1 Monitoring Well Inspections**

Monitoring wells were inspected to assess their condition and usability during the 4<sup>th</sup> Quarter 2018 Sampling Event. Monitoring well 33MW09S was found to have a bent casing and can no longer be sampled (See photo with Daily Quality Control Report for December 3 in Appendix A). This well needs to be abandoned. Wells 33MW10S and 33MW10D were unable to be located. These flush-mount wells are presumed to be intact but appear to be covered with rubble due to reworking of area. Attempts will be made to uncover these wells prior to the 2019 sampling event.

### **2.2 Water Level and Total Depth Measurements**

Field personnel used a standard water level meter to measure the static water level and total well depth on December 3, 2018, prior to sampling the site monitoring wells. Results of the well gauging activities are provided on Table 2-1.

### **2.3 Field Measurements**

Field equipment was calibrated and/or checked for accuracy at the beginning of each day. A LaMotte 2020 was used to measure turbidity and a YSI 556 Multiparameter System (MPS) was used to measure temperature, pH, specific conductance, DO, and ORP as monitoring wells were purged and immediately before the collection of groundwater samples. Field measurements are presented in the logbook and on the Monitoring Well Field Data Sheets (Appendix A). A summary of the field measurements is provided on Table 2-2.

### **2.4 Groundwater Sample Collection**

Samples were collected following low-flow sampling procedures using a non-dedicated bladder pump in accordance with the LTM Plan (Burns & McDonnell, 2018). Groundwater samples were collected from the following monitoring wells during the 4<sup>th</sup> Quarter 2018 Sampling Event: 33MW05S, 33MW05I, 33MW05D, 33MW06D, 33MW07S, 33MW07D, 33MW08S, 33MW11S, 33MW11D, 33MW16S, and 33MW16D. Monitoring Well 33MW09S is damaged and could not be sampled as outlined in the LTM

Plan (Burns & McDonnell, 2018). Monitoring wells 33MW16S and 33MW16D were sampled in lieu of 33MW10S and 33MW10D which were under rubble during the sampling event. Groundwater samples were submitted for analysis for VOCs and MNA parameters (methane, ethene, and ethane; total organic carbon [TOC]; manganese; nitrate; nitrite; sulfate; and sulfide) as outlined in the LTM Plan (Burns & McDonnell, 2018).

## **2.5 Field Quality Control**

During the 4<sup>th</sup> Quarter 2018 Sampling Event, quality assurance/quality control (QA/QC) samples included two field duplicate samples, one trip blank for each cooler with VOC samples, and one equipment rinsate blank. The field duplicate samples were collected from Monitoring Wells 33MW05I and 33MW08S. These duplicates were labeled as 33MW5-1000 and 33MW8-1000, respectively. A Data Validation Memorandum presenting the results of the QA/QC assessment is included as Appendix C.

\* \* \* \* \*

## 3.0 HYDROGEOLOGY

### 3.1 Groundwater Gradient and Flow Velocity

The groundwater elevation measurements collected on December 3, 2018 were previously presented on Table 2-1. Potentiometric surface maps for the shallow and deep portions of the unconsolidated water bearing unit for the 4<sup>th</sup> Quarter 2018 Sampling Event are presented as Figures 3-1 and 3-2. These maps were used to determine the direction of groundwater flow across the site and provided hydraulic gradients needed to calculate groundwater velocities. The data used to calculate linear groundwater velocities for the shallow and deep water bearing units are presented in Tables 3-1 through 3-4. The following summarizes the groundwater gradient and flow for the 4<sup>th</sup> Quarter 2018 Sampling Event:

#### Shallow Wells

- Predominant Groundwater Flow Direction: North - Northeast
- Variation in Groundwater Elevation: 8.74 feet (ft) (33MW15S at 741.26 ft vs 33MW11S at 732.52 ft)
- Range of Hydraulic Gradients: 0.0043 ft/ft to 0.02 ft/ft
- Range of Linear Velocities: 326 ft/year to 1,499 ft/year

#### Deep Wells

- Predominant Groundwater Flow Direction: North to Northeast
- Variation in Groundwater Elevation: 3.91 ft (33MW07D at 723.30 vs 33MW02D at 719.39 ft)
- Range of Hydraulic Gradients: 0.0027 ft/ft to 0.018 ft/ft
- Range of Linear Velocities: 115 ft/year to 779 ft/year

### 3.2 Screen Occlusion

The total depths of the monitoring wells were gauged on December 3, 2018. Wellbore siltation was assessed by comparing the measured well depth to the as-built well depth for all the Monitoring Wells listed on Table 2-1. The amount of siltation was then used to determine the percent of each well screen that had been occluded by sediment. As presented on Table 2-1, 33MW04, 33MW04S, 33MW06D, and 33MW08S all had screen occlusion greater than 10 percent. Of these, Monitoring Wells 33MW04 and 33MW04S will be abandoned. Redevelopment of Monitoring Wells 33MW06D and 33MW08S will be considered prior to the 2019 sampling event. All other wells had lower than 10 percent occlusion.

\* \* \* \* \*

## 4.0 ANALYTICAL RESULTS

### 4.1 Laboratory Analysis

Project samples were submitted to ALS Global of Houston, Texas (ALS) for analysis of VOCs and MNA parameters. Analytical results for the groundwater samples collected during the 4<sup>th</sup> Quarter 2018 Sampling Event are provided on Tables 4-1 (VOCs) and 4-2 (MNA parameters). Groundwater VOC results from 1997 through 2018 for wells in the LTM program are included in Appendix D.

### 4.2 Laboratory Quality Control and Data Validation

The analytical laboratories performed QA/QC per requirements established in the analytical methods and their standard operating procedures. Laboratory QC information (i.e., sample preparation, analytical holding times, method blank, surrogate spikes, laboratory control sample, and/or laboratory duplicate results) and field QC information (i.e., trip blanks, matrix spike/matrix spike duplicate, and field duplicates) were evaluated to confirm the validity of the results. The QC data were examined for achievement of any method-specific requirements. Data qualifiers, when appropriate, were added to the data as recommended in the United States Environmental Protection Agency's (USEPA's) *National Functional Guidelines for Inorganic Superfund Data Review* (USEPA, 2017a) and *National Functional Guidelines for Organic Superfund Data Review* (USEPA, 2017b).

A memo providing the details of the data validation and any external data qualifiers is provided in Appendix C. Holding times for nitrate and nitrite analyses for 33MW5D, 33MW5S, 33MW5I and 33MW5-1000 were out of the 48-hour range but tested within 8 hours of the holding time expiration. Results for nitrate and nitrite were qualified as estimated for these samples. An equipment rinsate blank, which collected after sampling 33MW5I, exhibited detections of ethylene (1.73 micrograms per liter [ $\mu\text{g/L}$ ]), methane (3.56  $\mu\text{g/L}$ ), and sulfide (1.36  $\mu\text{g/L}$ ). Samples collected after the rinsate blank with detections of those analytes that were less than five times the rinsate blank concentration were disregarded as a false positive (U flag). No data were rejected, and results are valid for use, as qualified, in reporting results of the groundwater monitoring event.

### 4.3 Volatile Organic Compounds

Groundwater analytical data for VOCs was compared to MCSs, which includes the following as outlined in the LTM Plan (Burns & McDonnell, 2018):

- Safe Drinking Water Act Maximum Contaminant Levels (MCLs) (USEPA, 2009)
- Tapwater screening values from the November 2018 USEPA Regional Screening Level (RSL) Table (USEPA, 2018)

The following conventions were used during the data screening:

- MCLs were used as the groundwater screening level for parameters that had MCLs.
- USEPA tapwater RSLs were used as the groundwater screening level for parameters that did not have MCLs.
- Data screening was not performed on parameters that were not detected (i.e., reporting limits were not screened).

Groundwater analytical data for VOCs is provided on Table 4-1. Historical data summaries for monitoring wells in the LTM program are presented in Appendix D. Shallow Monitoring Well 33MW8S exhibited MCS exceedances for 1,1-dichloroethane, 1,2-dichloroethene (1,2-DCE, as cis-1,2-DCE), and TCE. Near downgradient intermediate depth Monitoring Well 33MW5I exhibited MCS exceedances for chlorinated degradation products 1,2-DCE (as cis-1,2-DCE) and TCE. These detections were consistent with sampling results from 2014 and 2015. Chlorinated VOCs were not detected in perimeter monitoring wells, and the extent of the chlorinated VOC plume is unchanged from historical monitoring.

#### 4.4 Monitored Natural Attenuation Parameters

Groundwater analytical data for MNA parameters is provided on Table 4-2. Analytical and field measurements from the most contaminated monitoring well, 33MW5I, were screened for anaerobic biodegradation per the protocol recommended in USEPA's guidance *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water* (USEPA, 1998). A summary of the analyte versus reference points used in the screening is provided below.

Analysis	Reference Concentration – Point Value	Concentration at 33MW5I	Points Awarded
TCE	Material released = 0 Daughter product = 2	Material released ND (1.0 U µg/L)	0
DCE	Daughter product of TCE = 2	430 µg/L	2
Vinyl Chloride (VC)	Daughter product DCE = 2	140 µg/L	2
Ethylene	>0.01 mg/L = 2 Daughter product of VC	Ethylene = 0.0175 J mg/L	2
Ethane	>0.1 mg/L = 3 Daughter product of ethylene	Ethane = 0.0086 J mg/L	0
Methane	<0.5 mg/L = 0 >0.5 mg/L = 3	1.26 mg/L	3
Nitrate	<1 mg/L = 2	ND (0.100 UJ mg/L)	2
Sulfate	<20 mg/L = 2	272 mg/L	0
Sulfide	>1 mg/L = 3	ND (1.00 U mg/L)	0
TOC	>20 mg/L = 2	4.86 mg/L	0

<b>Analysis</b>	<b>Reference Concentration – Point Value</b>	<b>Concentration at 33MW5I</b>	<b>Points Awarded</b>
DO	<0.5 mg/L = 3 >5 mg/L = -3	4.32 mg/L	0
ORP	<50 mV = 1 <-100 mV = 2	-62.9 mV	1
pH	5 < pH < 9 = 0 5 > pH > 9 = -2	6.80	0
Temperature	>20°C = 1	10.08	0
<b>Total Points Awarded</b>			<b>12</b>

Based upon the screening, there is evidence of anaerobic degradation of chlorinated organics within the plume area.

\* \* \* \* \*

## 5.0 SUMMARY AND CONCLUSIONS

The 4<sup>th</sup> Quarter 2018 Sampling Event was conducted from December 3 through 5, 2018. The following issues were noted during monitoring well inspections on December 3:

- The casing for Monitoring well 33MW09S was destroyed, and this well can no longer be sampled.
- Flush-mount Monitoring Wells 33MW10S and 33MW10D were unable to be located but are presumed to be intact under rubble in the area. Monitoring Wells 33MW16S and 33MW16D were sampled in place of these wells.

Groundwater elevations observed during the sampling event indicates groundwater flow direction was generally to the north to northeast for the shallow wells and to the north for the deep wells.

- The calculated hydraulic gradient for shallow wells during the 4<sup>th</sup> Quarter 2018 Sampling Event ranged from 0.0043 ft/ft to 0.02 ft/ft and the estimated linear groundwater velocity ranged from 326 ft/year to 1,499 ft/year.
- The calculated hydraulic gradient for deep wells during the 4<sup>th</sup> Quarter 2018 Sampling Event ranged from 0.0027 ft/ft to 0.018 ft/ft and the estimated linear groundwater velocity ranged from 115 ft/year to 779 ft/year.

Groundwater samples were collected from monitoring wells using low-flow sampling techniques. Samples were submitted to ALS for analysis of VOCs and MNA parameters (Tables 4-1 and 4-2). No exceedances of MCSs were noted adjacent to the Blue River, downgradient of the former source area (Abandoned Wells 33MW2/33MW2S/33MW3R). Perimeter wells 33MW10S and 33MW10D were unable to be sampled this event, and Monitoring Wells 33MW16S and 33MW16D were sampled instead. VOCs were not detected in groundwater samples collected from Monitoring Wells 33MW5D, 33MW6D, 33MW7S, 33MW7D, 33MW11S, 33MW11D, 33MW16S, and 33MW16D. Exceedances of MCSs were noted for 1,1-dichloroethane (33MW8S), cis-1,2-DCE (33MW5I and 33MW8S), TCE (33MW8S), and vinyl chloride (33MW5I). Chlorinated VOC detections noted in Monitoring Wells 33MW8S, 33MW5S, and 33MW5I were consistent with historically-observed detections.

Analytical and field measurements from the most contaminated monitoring well, 33MW5I, were screened for anaerobic biodegradation per the protocol recommended in USEPA's guidance *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water* (USEPA, 1998). Based upon

the screening, there is evidence of anaerobic degradation of chlorinated organics within the plume area. In particular, the degradation of TCE to vinyl chloride is continuing to take place above the semi-confining layer as noted in the groundwater results for Monitoring Well 33MW5I. TCE is no longer detected in groundwater from this well and has decreased from a historical high of 806 µg/L in 1998. Daughter products of cis-1,2-DCE and vinyl chloride are present. In particular, vinyl chloride has increased over time.

Groundwater will continue to be monitored using low-flow sampling techniques, with the next groundwater sampling event to be conducted in 4<sup>th</sup> Quarter of 2019.

\* \* \* \* \*

## 6.0 REPORT LIMITATIONS

This document has been prepared in accordance with generally accepted environmental engineering and geologic practices for groundwater quality monitoring and reporting. Conclusions contained herein are Burns & McDonnell's interpretation of readily available data and constitute a professional opinion based on said data. No other warranty, express or implied, is made as to the information included in this document. In the event that others make conclusions and recommendations based on data contained herein, such conclusions and recommendations are the responsibility of others.

Burns & McDonnell has exercised reasonable skill, care, and diligence in preparation of this report in accordance with customarily accepted standards of good professional practice in effect at the time this report was prepared. Special risks are inherently associated with the characterization and description of groundwater quality, including, but not limited to: groundwater occurrence, groundwater contaminant concentrations, soil gas composition and concentration, site geology and site hydrogeology. Even a comprehensive groundwater assessment and/or monitoring program using appropriate equipment, implemented by experienced personnel under the direction of trained professionals may fail to detect certain conditions. Therefore, such conditions are hidden and may not be identified in this report. For similar reasons, conditions inferred to exist between sampling points might differ significantly from the conditions that actually exist.

Changes in subsurface conditions can be influenced by many factors. These factors include but are not limited to: management of surrounding areas, off-site contaminant sources, seasonal rainfall fluctuations, changes in drainage conditions in and around the site, changes in contaminant source area and composition, groundwater occurrence, and biodegradation. Over time, actual conditions discovered through sampling are subject to variation because of natural occurrences and/or man-made intervention on or near the site.

\* \* \* \* \*

## 7.0 REFERENCES

- Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell). 2018. *Long Term Monitoring Plan, SWMU 33, Nail Mill Degreasing Area, Former AK Steel Kansas City Facility, EPA ID MOD 007 118 029*. May.
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- USEPA, 2018. *Regional Screening Levels (RSL) Summary Table*. RSL Table Update November 2018.

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## TABLES

**Table 1-1**  
**Environmental Investigations and Remedial Actions for SWMU 33**  
*SWMU 33 Long Term Monitoring Program*

<b>Date</b>	<b>Description</b>	<b>Report</b>
1996 - 1998	Interim Measures and Resource Conservation and Recovery Act (RCRA) Facility Investigation	<i>RCRA Facility Investigation Report, Armco Kansas City Facility</i> (Burns & McDonnell Waste Consultants, Inc., 1999)
2001	Groundwater sampling event	<i>Groundwater Monitoring Report, February 2001 Sampling Event, AK Steel Kansas City Facility</i> (Burns & McDonnell, 2001)
2007	Supplemental RCRA Facility Investigation - SWMU 33 activities included monitoring well installation and groundwater sampling.	<i>Supplemental Investigation Report, AK Steel, Kansas City, Missouri</i> (Burns & McDonnell, 2008)
2010	Supplemental soil investigation to support the design of a pilot test for remediation of chlorinated solvents in soil	<i>Supplemental Investigation Addendum Report and Pilot Study Work Plan for the SWMU 33 Nail Mill Degreasing Area Soil Investigation for AK Steel, Kansas City, Missouri</i> (Burns & McDonnell, 2010)
2011	Soil vapor extraction and dual phase extraction pilot test	<i>SVE/DPE Pilot Test Evaluation for the SWMU 33 Nail Mill Degreasing Area, AK Steel, Kansas City, Missouri</i> (Burns & McDonnell, 2011)
2012	Surface material sampling	<i>Additional Sampling of SWMUs 2, 4, 13, 17, and 33 Report, AK Steel, Kansas, Missouri</i> (Burns & McDonnell, 2012)
2013	Corrective Measures Study - Corrective measures recommended for SWMU 33 included excavation and disposal of soil, land use restrictions, and monitored natural attenuation (MNA) for groundwater.	<i>Final Corrective Measures Study Report for SWMUs 2, 3, 4, 5, 6, 7, 12, 13, 17, 24, 33, and AOCs 1, 4, and 8, AK Steel, Kansas City, Missouri</i> (CMS Report) (Burns & McDonnell, 2016)
2014	Installation of monitoring wells associated with SWMU 17, which were incorporated into the SWMU 33 well network.	<i>Additional Sampling of Former Tank Farm and SWMU 17 Report, AK Steel Kansas City, Missouri</i> (Burns & McDonnell, 2014)
06/07 / 2014	Groundwater sampling event	<i>Additional Sampling of Former Tank Farm and SWMU 17 Report, AK Steel Kansas City, Missouri</i> (Burns & McDonnell, 2014)
09 / 2014	Groundwater sampling event	<i>September 2014 Groundwater Sampling Report, SWMUs 33 and 17, AK Steel, Kansas City, Missouri</i> (Burns & McDonnell, 2014)
12 / 2014	Groundwater sampling event	<i>December 2014 Groundwater Sampling Report, SWMUs 33 and 17, AK Steel, Kansas City, Missouri</i> (Burns & McDonnell, 2015)
03 / 2015	Groundwater sampling event	<i>March 2015 Groundwater Sampling Report, SWMUs 33 and 17, AK Steel, Kansas City, Missouri</i> (Burns & McDonnell, 2015)
2015	Interim Measures Work Plan - Corrective actions for SWMU 33 included excavation and disposal of soil followed by site restoration, land use controls on future land and groundwater use, and MNA for groundwater remediation.	<i>Final Interim Measures Work Plan, SWMUs 4, 7, and 33 and AOC 8, AK Steel Kansas City Facility</i> (Burns & McDonnell, 2015)
2017	Abandonment of monitoring wells and removal of soil with elevated levels of chlorinated VOCs.	<i>Soil Interim Measure Completion Report, SWMU 33 – Nail Mill Degreasing Area</i> (Burns & McDonnell, 2017)
2018	Long-term monitoring (LTM) / MNA groundwater sampling event	<i>Groundwater Monitoring Report, 4th Quarter 2018 Sampling Event, SWMU 33 – Nail Mill Degreasing Area</i> (Burns & McDonnell, 2019)

**Table 2-1**  
**Groundwater Elevation Data**  
*SWMU 33 Long Term Monitoring Program*

Well No.	Easting (corrected)	Northing (corrected)	Ground Elevation (FMSL)	TOC (FMSL)	Total Depth from TOC (1999 RFI)	Depth to Water 12/3/2018 (FBTOC)	Total Depth from TOC (FBTOC)	Screen Length (feet)	Screen Occlusion (feet)	Water Level Elevation (FMSL)	Well to be Abandoned
<b>Deep Wells</b>											
17MW01D	501203.50	1070835.20	744.83	744.55	66.45	21.83	67.18	10	-7%	722.72	X
17MW02D	501353.90	1071042.00	742.61	742.18	61.55	22.79	62.16	10	-6%	719.39	X
33MW04	500354.98	1070983.66	748.12	747.86	72.27	26.32	70.10	10	22%	721.54	X
33MW05D	501017.71	1070903.79	746.41	746.02	68.61	23.70	68.74	10	-1%	722.32	
33MW06D	500601.87	1071190.10	749.30	751.95	74.15	30.23	71.29	10	29%	721.72	
33MW07D	500668.10	1070606.80	746.97	746.63	69.63	23.33	68.87	10	8%	723.30	
33MW10D	500243.24	1071542.85	746.31	745.87	67.42	-	-	10	-	--	
33MW11D	501116.48	1071241.41	740.57	740.12	60.94	18.54	60.83	10	1%	721.58	
33MW12D	501227.00	1070666.52	746.87	746.56	68.84	22.92	68.65	10	2%	723.64	X
33MW13D	501314.06	1070804.04	745.20	744.90	68.69	22.18	68.20	10	5%	722.72	X
33MW14D	500093.56	1070733.07	748.75	748.42	69.13	26.62	68.42	10	7%	721.80	X
33MW15D	500287.85	1071198.49	751.37	753.45	86.39	31.88	86.75	10	-4%	721.57	X
33MW16D	500004.37	1071473.53	750.97	753.23	77.56	31.85	77.80	10	-2%	721.38	X
<b>Intermediate Wells</b>											
17MW02I	501351.80	1071045.80	742.63	742.25	39.78	8.88	39.85	10	-1%	733.37	X
33MW05I	501012.78	1070890.09	746.54	746.27	41.00	8.11	41.24	10	-2%	738.16	
<b>Shallow Wells</b>											
17MW01S	501199.00	1070837.50	744.80	744.44	18.76	7.79	18.85	10	-1%	736.65	X
17MW02S	501349.50	1071049.30	742.71	742.20	18.86	8.94	18.77	10	1%	733.26	X
33MW04S	500363.55	1070983.16	748.14	747.91	19.77	9.56	17.44	10	23%	738.35	X
33MW05S	501016.28	1070896.49	746.59	746.38	18.29	8.46	18.37	10	-1%	737.92	
33MW07S	500667.87	1070601.50	746.96	746.59	20.59	6.74	20.54	10	1%	739.85	
33MW08S	500364.47	1070807.40	747.27	747.08	18.28	8.53	16.84	10	14%	738.55	
33MW09S	500691.85	1071320.18	747.44	750.19	22.43	-	-	10	-	--	
33MW10S	500243.09	1071545.53	746.26	745.93	17.27	-	-	10	-	--	
33MW11S	501109.05	1071242.97	740.24	739.74	17.99	7.22	17.74	10	3%	732.52	
33MW12S	501218.66	1070667.18	746.84	746.24	17.44	8.09	17.12	10	3%	738.15	X
33MW13S	501320.69	1070804.26	745.24	744.79	17.69	7.33	17.73	10	0%	737.46	X
33MW14S	500093.51	1070738.25	748.87	748.52	18.24	7.95	18.16	10	1%	740.57	X
33MW15S	500288.65	1071203.57	751.09	753.18	27.00	11.92	27.03	10	0%	741.26	X
33MW16S	499999.36	1071472.24	751.00	753.52	28.00	16.00	27.83	10	2%	737.52	X

FMSL - Feet above mean sea level

TOC - Top of casing

FBTOC - Feet below top of casing

Shallow - Screened in the shallow saturated zone

Intermediate - Intermediate wells are screened directly over the semi-confining layer of the deep saturated zone.

Deep - Deep wells are screened just above bedrock in the deep semi-confined saturated zone.

1999 RFI - RCRA Facility Investigation Report, Armco Kansas City Facility (Burns & McDonnell Waste Consultants, Inc., 1999)

**Table 2-2**  
**Field Measurements**  
*SWMU 33 Long Term Monitoring Program*

Monitoring Well	Date	pH (Std. Units)	Temperature (°C)	Conductivity (µmhos/cm)	Turbidity (NTU)	ORP (mV)	DO (mg/L)
33MW5S	12/4/2018	7.04	9.57	0.854	25	-40.2	9.59
33MW5I	12/4/2018	6.80	10.08	1.078	5.3	-62.9	4.32
33MW5D	12/4/2018	7.03	13.77	1.327	38	-76.0	9.34
33MW6D	12/5/2018	7.43	15.46	1.628	11.8	-77.4	16.25
33MW7S	12/4/2018	7.07	13.13	0.959	10	-28.8	2.88
33MW7D	12/4/2018	7.09	11.56	1.118	6.0	-108.8	4.23
33MW8S	12/5/2018	7.03	15.81	1.385	13	4.8	9.19
33MW11S	12/5/2018	7.43	14.80	0.527	9.6	-47.1	3.74
33MW11D	12/5/2018	7.69	13.79	3.241	19	-132.6	2.19
33MW16S	12/5/2018	7.38	13.53	0.632	20.9	-13.9	8.76
33MW16D	12/5/2018	7.32	14.94	1.268	15	-109.8	2.70

°C - degrees Celsius  
DO - dissolved oxygen  
µmhos/cm - microohms per centimeter  
mg/L - milligrams per liter  
mV - millivolts  
NTU - nephelometric turbidity unit  
ORP - oxidation-reduction potential

**Table 3-1**  
**Shallow Minimum Estimated Hydraulic Gradient and Linear Groundwater Velocity**  
**December 3, 2018**  
*SWMU 33 Long Term Monitoring Program*

**Estimated Linear Groundwater Velocity:**

$$V = \frac{k \times i}{n_e}$$

Where:

V	=	estimated linear groundwater velocity (ft/day)
k	=	hydraulic conductivity (average for shallow wells)*
	=	1.59E-02 cm/sec
	=	45.17 ft/day
i	=	estimated hydraulic gradient (ft/ft)
n <sub>e</sub>	=	effective porosity (percent)
	=	0.22 (estimated for clayey sandy gravels)

**Estimated Hydraulic Gradient:**

$$i = \frac{dh}{dL}$$

Where:

dh	=	head difference between data points (ft)
dL	=	lateral distance between head difference (ft)

Between 738 and 737 Contours (Refer to Figure 3-1)
$i = \frac{1.00 \text{ ft}}{230 \text{ ft}}$
$i = 4.3E-03 \text{ ft/ft}$
$V = \frac{45.17 \text{ ft/day} * 4.3E-03 \text{ ft/ft}}{0.22}$
$V = 8.9E-01 \text{ ft/day}$
$V = 326 \text{ ft/year}$

**Estimated Groundwater Velocity:**

Note: The information contained in this table relates to groundwater flow on Figure 3-1.

\* Hydraulic conductivity from pump tests conducted at Monitoring Well 33MW5S as presented in the *RCRA Facility Investigation Report, Armco Kansas City Facility* (Burns & McDonnell Waste Consultants, Inc., 1999)

cm - centimeters  
 ft - feet  
 sec - second

**Table 3-2**  
**Shallow Maximum Estimated Hydraulic Gradient and Linear Groundwater Velocity**  
**December 3, 2018**  
*SWMU 33 Long Term Monitoring Program*

**Estimated Linear Groundwater Velocity:**

$$V = \frac{k \times i}{n_e}$$

Where:

V	=	estimated linear groundwater velocity (ft/day)
k	=	hydraulic conductivity (average for shallow wells)*
	=	1.59E-02 cm/sec
	=	45.17 ft/day
i	=	estimated hydraulic gradient (ft/ft)
n <sub>e</sub>	=	effective porosity (percent)
	=	0.22 (estimated for clayey sandy gravels)

**Estimated Hydraulic Gradient:**

$$i = \frac{dh}{dL}$$

Where:

dh	=	head difference between data points (ft)
dL	=	lateral distance between head difference (ft)

Between 735 and 734 Contours (Refer to Figure 3-1)
$i = \frac{1.00 \text{ ft}}{50 \text{ ft}}$
$i = 2.0E-02 \text{ ft/ft}$
$V = \frac{45.17 \text{ ft/day} * 2.0E-02 \text{ ft/ft}}{0.22}$
$V = 4.1E+00 \text{ ft/day}$
$V = 1499 \text{ ft/year}$

**Estimated Groundwater Velocity:**

Note: The information contained in this table relates to groundwater flow on Figure 3-1.  
 \* Hydraulic conductivity from pump tests conducted at Monitoring Well 33MW5S as presented in the *RCRA Facility Investigation Report, Armco Kansas City Facility* (Burns & McDonnell Waste Consultants, Inc., 1999)

cm - centimeters  
 ft - feet  
 sec - second

**Table 3-3**  
**Deep Minimum Estimated Hydraulic Gradient and Linear Groundwater Velocity**  
**December 3, 2018**  
*SWMU 33 Long Term Monitoring Program*

**Estimated Linear Groundwater Velocity:**

$$V = \frac{k \times i}{n_e}$$

Where:

V	=	estimated linear groundwater velocity (ft/day)
k	=	hydraulic conductivity (average for deep wells)*
	=	1.74E-02 cm/sec
	=	49.42 ft/day
i	=	estimated hydraulic gradient (ft/ft)
n <sub>e</sub>	=	effective porosity (percent)
	=	0.42 (estimated for silty or sandy clay)

**Estimated Hydraulic Gradient:**

$$i = \frac{dh}{dL}$$

Where:

dh	=	head difference between data points (ft)
dL	=	horizontal distance between head difference (ft)

Between 723.00 and 722.00 Contours (Refer to Figure 3-2)
$i = \frac{1.00 \text{ ft}}{375 \text{ ft}}$
$i = 2.7\text{E-}03 \text{ ft/ft}$
$V = \frac{49.42 \text{ ft/day} * 2.7\text{E-}03 \text{ ft/ft}}{0.42}$
$V = 3.1\text{E-}01 \text{ ft/day}$
$V = 115 \text{ ft/year}$

**Estimated Groundwater Velocity:**

Note: The information contained in this table relates to groundwater flow on Figure 3-2.

\* Hydraulic conductivity from slug tests conducted at Monitoring Well 33MW5D as presented in the *RCRA Facility Investigation Report, Armo Kansas City Facility* (Burns & McDonnell Waste Consultants, Inc., 1999)

cm - centimeters  
ft - feet  
sec - second

**Table 3-4**  
**Deep Maximum Estimated Hydraulic Gradient and Linear Groundwater Velocity**  
**December 3, 2018**  
*SWMU 33 Long Term Monitoring Program*

**Estimated Linear Groundwater Velocity:**

$$V = \frac{k \times i}{n_e}$$

Where:

V	=	estimated linear groundwater velocity (ft/day)
k	=	hydraulic conductivity (average for site)*
	=	1.7E-02 cm/sec
	=	49.32 ft/day
i	=	estimated hydraulic gradient (ft/ft)
n <sub>e</sub>	=	effective porosity (percent)
	=	0.42 (estimated for silty or sandy clay)

**Estimated Hydraulic Gradient:**

$$i = \frac{dh}{dL}$$

Where:

dh	=	head difference between data points (ft)
dL	=	horizontal distance between head difference (ft)

Between 722.00 and 721.00 Contours (Refer to Figure 3-2)
$i = \frac{1.00 \text{ ft}}{55 \text{ ft}}$
$i = 1.8E-02 \text{ ft/ft}$
$V = \frac{49.32 \text{ ft/day} * 1.8E-02 \text{ ft/ft}}{0.42}$
$V = 2.1E+00 \text{ ft/day}$
$V = 779 \text{ ft/year}$

**Estimated Groundwater Velocity:**

Note: The information contained in this table relates to groundwater flow on Figure 3-2.

\* Hydraulic conductivity from slug tests conducted at Monitoring Well 33MW5D as presented in the *RCRA Facility Investigation Report, Armco Kansas City Facility* (Burns & McDonnell Waste Consultants, Inc., 1999)

cm - centimeters  
ft - feet  
sec - second

**Table 4-1**  
**VOC Analytical Results - 2018 Event**  
*SWMU 33 Long Term Monitoring Program*

Sample Name	Well ID	Date	Analyte: Units:	1,1,1- Trichloro ethane µg/L	1,1,2- Trichloro ethane µg/L	1,1- Dichloro ethane µg/L	1,1- Dichloro ethene µg/L	1,2-Dichloro ethane µg/L	1,2-Dichloro ethene µg/L	Acetone µg/L	Benzene µg/L	Carbon disulfide µg/L
<b>MCS for Groundwater</b>				<b>200</b>	<b>5</b>	<b>2.8</b>	<b>7</b>	<b>5</b>	<b>70</b>	<b>14,000</b>	<b>5</b>	<b>810</b>
33MW5D / GW01	33MW5D	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U
33MW5I / GW01	33MW5I	12/4/2018		1.0 U	1.0 U	1.0 U	<b>1.7</b>	1.0 U	<b>380</b>	2.0 U	1.0 U	2.0 U
33MW5-1000 / GW01 Dup	33MW5I	12/4/2018	Duplicate	1.0 U	1.0 U	<b>1.1</b>	<b>1.8</b>	1.0 U	<b>440</b>	2.0 U	1.0 U	2.0 U
33MW5S / GW01	33MW5S	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	<b>6.4</b>	2.0 U	1.0 U	2.0 U
33MW6D / GW01	33MW6D	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U
33MW7D / GW01	33MW7D	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U
33MW7S / GW01	33MW7S	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U
33MW8S / GW01	33MW8S	12/5/2018		1.0 U	1.0 U	<b>9.5</b>	1.0 U	1.0 U	<b>79</b>	2.0 U	1.0 U	2.0 U
33MW8-1000 / GW01 Dup	33MW8S	12/5/2018	Duplicate	1.0 U	1.0 U	<b>9.9</b>	1.0 U	1.0 U	<b>85</b>	2.0 U	1.0 U	2.0 U
33MW11D / GW01	33MW11D	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	<b>3.0</b>	1.0 U	2.0 U
33MW11S / GW01	33MW11S	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U
33MW16D / GW01	33MW16D	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U
33MW16S / GW01	33MW16S	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U

**Bold** - Parameter was detected.

**Shaded** - Result exceeded MCS.

µg/L - micrograms per liter

MCS - media cleanup standard

U - Not Detected. Value is the reporting limit.

**Table 4-1**  
**VOC Analytical Results - 2018 Event**  
*SWMU 33 Long Term Monitoring Program*

Sample Name	Well ID	Date	Analyte: Units:	Chloroform µg/L	cis-1,2- Dichloro ethene µg/L	Ethyl benzene µg/L	Methylene chloride µg/L	Tetra chloro ethene µg/L	Toluene µg/L	trans-1,2- Dichloro ethene µg/L	Trichloro ethene µg/L	Vinyl chloride µg/L
<b>MCS for Groundwater</b>				<b>80</b>	<b>70</b>	<b>700</b>	<b>5</b>	<b>5</b>	<b>1,000</b>	<b>100</b>	<b>5</b>	<b>2</b>
33MW5D / GW01	33MW5D	12/4/2018		1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW5I / GW01	33MW5I	12/4/2018		1.0 U	<b>370</b>	1.0 U	2.0 U	1.0 U	1.0 U	5.0 U	1.0 U	<b>140</b>
33MW5-1000 / GW01 Dup	33MW5I	12/4/2018	Duplicate	1.0 U	<b>430</b>	1.0 U	2.0 U	1.0 U	1.0 U	5.0 U	1.0 U	<b>130</b>
33MW5S / GW01	33MW5S	12/4/2018		1.0 U	<b>6.4</b>	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW6D / GW01	33MW6D	12/5/2018		1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW7D / GW01	33MW7D	12/4/2018		1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW7S / GW01	33MW7S	12/4/2018		1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW8S / GW01	33MW8S	12/5/2018		1.0 U	<b>78</b>	1.0 U	2.0 U	1.0 U	1.0 U	<b>1.6</b>	<b>39</b>	1.0 U
33MW8-1000 / GW01 Dup	33MW8S	12/5/2018	Duplicate	1.0 U	<b>83</b>	1.0 U	2.0 U	1.0 U	1.0 U	<b>1.7</b>	<b>42</b>	1.0 U
33MW11D / GW01	33MW11D	12/5/2018		1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW11S / GW01	33MW11S	12/5/2018		1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW16D / GW01	33MW16D	12/5/2018		1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW16S / GW01	33MW16S	12/5/2018		1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

**Bold** - Parameter was detected.

**Shaded** - Result exceeded MCS.

µg/L - micrograms per liter

MCS - media cleanup standard

U - Not Detected. Value is the reporting limit.

**Table 4-1**  
**VOC Analytical Results - 2018 Event**  
*SWMU 33 Long Term Monitoring Program*

Sample Name	Well ID	Date	Analyte: Units:	Xylenes, Total µg/L
<b>MCS for Groundwater</b>				<b>10,000</b>
33MW5D / GW01	33MW5D	12/4/2018		1.0 U
33MW5I / GW01	33MW5I	12/4/2018		1.0 U
33MW5-1000 / GW01 Dup	33MW5I	12/4/2018	Duplicate	1.0 U
33MW5S / GW01	33MW5S	12/4/2018		1.0 U
33MW6D / GW01	33MW6D	12/5/2018		1.0 U
33MW7D / GW01	33MW7D	12/4/2018		1.0 U
33MW7S / GW01	33MW7S	12/4/2018		1.0 U
33MW8S / GW01	33MW8S	12/5/2018		1.0 U
33MW8-1000 / GW01 Dup	33MW8S	12/5/2018	Duplicate	1.0 U
33MW11D / GW01	33MW11D	12/5/2018		1.0 U
33MW11S / GW01	33MW11S	12/5/2018		1.0 U
33MW16D / GW01	33MW16D	12/5/2018		1.0 U
33MW16S / GW01	33MW16S	12/5/2018		1.0 U

**Bold** - Parameter was detected.

**Shaded** - Result exceeded MCS.

µg/L - micrograms per liter

MCS - media cleanup standard

U - Not Detected. Value is the reporting limit.

**Table 4-2**  
**Monitored Natural Attenuation Analytical Results - 2018 Event**  
*SWMU 33 Long Term Monitoring Program*

Sample ID	Well ID	Date	Analyte: Units:	Ethane mg/L	Ethylene mg/L	Methane mg/L	Nitrogen, Nitrate mg/L	Nitrogen, Nitrite mg/L	Sulfate mg/L	Sulfide mg/L	Total Organic Carbon mg/L	Manganese mg/L
33MW5D / GW01	33MW5D	12/4/2018		0.100 U	0.100 U	<b>1.56</b>	<b>0.111 J-</b>	0.100 UJ	<b>74.3</b>	2.84 U	<b>3.94</b>	<b>0.688</b>
33MW5I / GW01	33MW5I	12/4/2018		0.001 UJ	<b>0.0175 J</b>	<b>1.01</b>	0.100 UJ	0.100 UJ	<b>256</b>	1.64 U	<b>4.73</b>	<b>9.71</b>
33MW5-1000 / GW01 Dup	33MW5I	12/4/2018	Duplicate	<b>0.0086 J</b>	0.001 UJ	<b>1.26</b>	0.100 UJ	0.100 UJ	<b>272</b>	1.00 U	<b>4.86</b>	<b>9.19</b>
33MW5S / GW01	33MW5S	12/4/2018		0.001 U	0.00164 U	0.0155 U	0.100 UJ	0.100 UJ	<b>61.3</b>	1.00 U	<b>5.32</b>	<b>12.8</b>
33MW6D / GW01	33MW6D	12/5/2018		0.001 U	0.001 U	0.0141 U	0.100 U	0.100 U	<b>105</b>	2.44 U	<b>2.80</b>	<b>1.38</b>
33MW7D / GW01	33MW7D	12/4/2018		<b>0.371</b>	0.200 U	<b>1.00</b>	0.100 U	0.100 U	<b>40.9</b>	1.00 U	<b>4.44</b>	<b>0.492</b>
33MW7S / GW01	33MW7S	12/4/2018		0.001 U	0.00166 U	0.00522 U	<b>0.266</b>	0.100 U	<b>69.1</b>	1.44 U	<b>2.29</b>	<b>3.18</b>
33MW8S / GW01	33MW8S	12/5/2018		0.001 U	0.00136 U	0.00864 U	0.100 U	0.100 U	<b>279</b>	1.84 U	<b>2.60</b>	<b>0.632</b>
33MW8-1000 / GW01 Dup	33MW8S	12/5/2018	Duplicate	0.001 U	0.00328 U	0.00672 U	0.100 U	0.100 U	<b>280</b>	1.24 U	<b>2.62</b>	<b>0.623</b>
33MW11D / GW01	33MW11D	12/5/2018		<b>0.00112</b>	0.00282 U	<b>0.103</b>	0.100 U	0.100 U	<b>12.9</b>	1.84 U	<b>3.17</b>	<b>0.634</b>
33MW11S / GW01	33MW11S	12/5/2018		0.001 U	0.001 U	0.00966 U	0.100 U	0.100 U	<b>38.0</b>	2.24 U	<b>7.76</b>	<b>0.944</b>
33MW16D / GW01	33MW16D	12/5/2018		0.400 U	0.400 U	<b>2.13</b>	0.100 U	0.100 U	0.500 U	1.64 U	<b>2.32</b>	<b>0.560</b>
33MW16S / GW01	33MW16S	12/5/2018		0.001 U	0.00167 U	0.00672 U	<b>0.114</b>	0.100 U	<b>21.5</b>	1.00 U	<b>2.44</b>	<b>7.69</b>

**Bold** - Parameter was detected.

mg/L - milligrams per liter

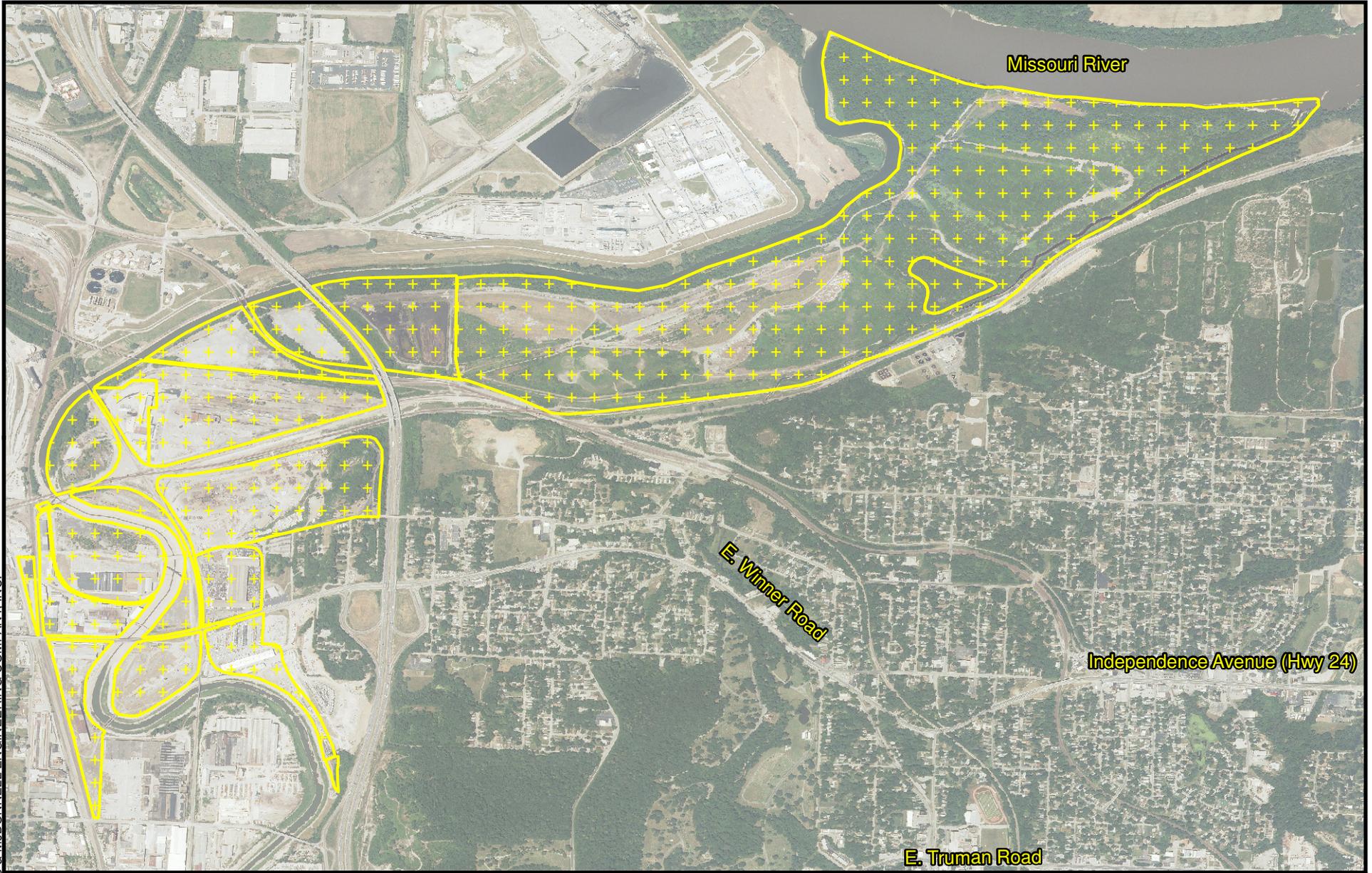
J - Estimated value

J- - Estimated value. Potentially biased low.

U - Not Detected. Value is the reporting limit.

UJ - Not Detected. Reporting limit is an estimated value.

## FIGURES



**Legend**

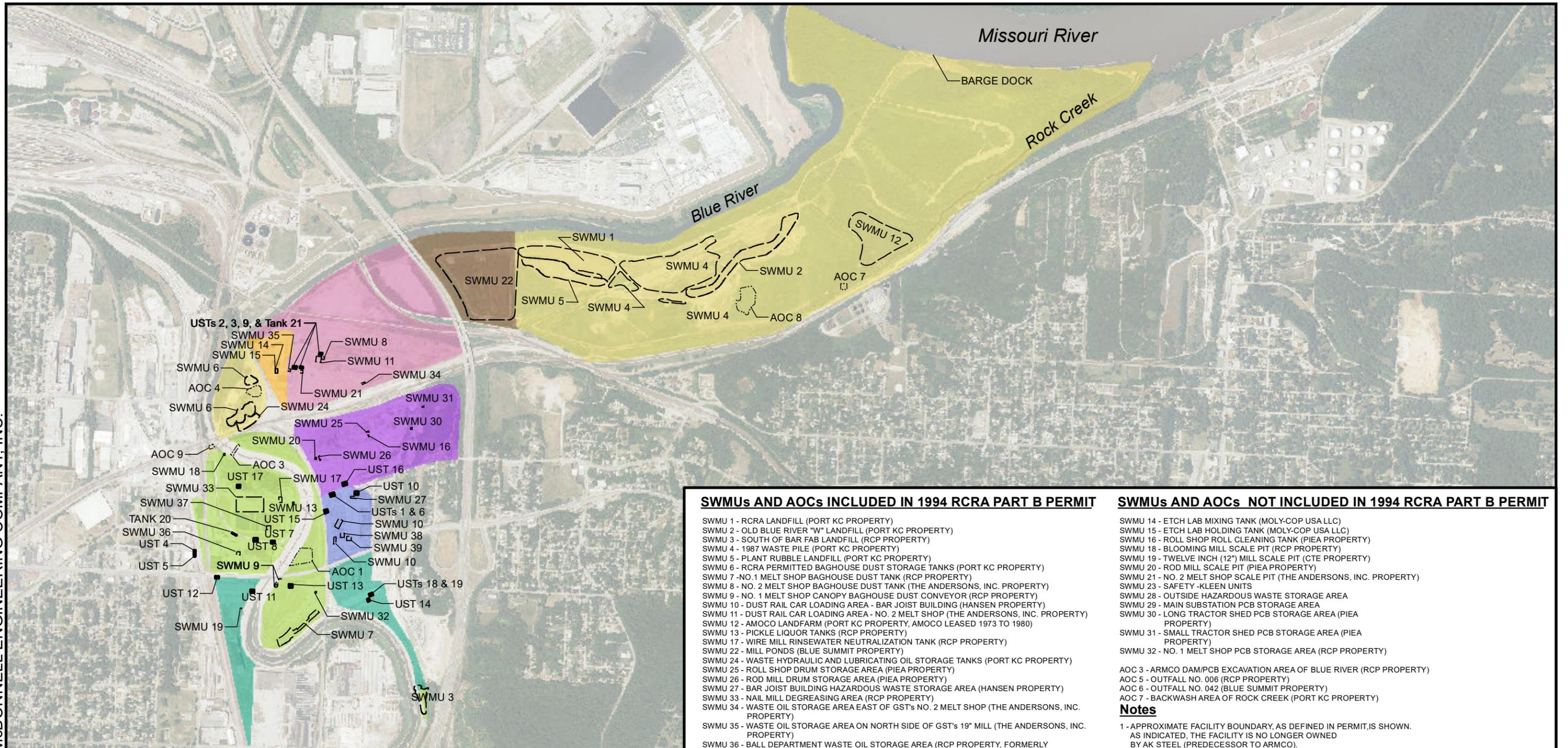
 RCRA Facility Boundary



Source: ESRI and Burns & McDonnell Engineering.



**Figure 1-1**  
**RCRA Facility Location Map**  
Former Armco KC Works  
Kansas City, Missouri



**SWMUs AND AOCs INCLUDED IN 1994 RCRA PART B PERMIT**

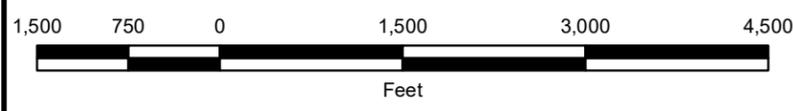
- SWMU 1 - RCRA LANDFILL (PORT KC PROPERTY)
- SWMU 2 - OLD BLUE RIVER "W" LANDFILL (PORT KC PROPERTY)
- SWMU 3 - SOUTH OF BAR FAB LANDFILL (RCP PROPERTY)
- SWMU 4 - 1987 WASTE PILE (PORT KC PROPERTY)
- SWMU 5 - PLANT RUBBLE LANDFILL (PORT KC PROPERTY)
- SWMU 6 - RCRA PERMITTED BAGHOUSE DUST STORAGE TANKS (PORT KC PROPERTY)
- SWMU 7 - NO.1 MELT SHOP BAGHOUSE DUST TANK (RCP PROPERTY)
- SWMU 8 - NO. 2 MELT SHOP BAGHOUSE DUST TANK (THE ANDERSONS, INC. PROPERTY)
- SWMU 9 - NO. 1 MELT SHOP CANOPY BAGHOUSE DUST CONVEYOR (RCP PROPERTY)
- SWMU 10 - DUST RAIL CAR LOADING AREA - BAR JOIST BUILDING (HANSEN PROPERTY)
- SWMU 11 - DUST RAIL CAR LOADING AREA - NO. 2 MELT SHOP (THE ANDERSONS, INC. PROPERTY)
- SWMU 12 - AMOCO LANDFARM (PORT KC PROPERTY, AMOCO LEASED 1973 TO 1980)
- SWMU 13 - PICKLE LIQUOR TANKS (RCP PROPERTY)
- SWMU 17 - WIRE MILL RINSEWATER NEUTRALIZATION TANK (RCP PROPERTY)
- SWMU 22 - MILL PONDS (BLUE SUMMIT PROPERTY)
- SWMU 24 - WASTE HYDRAULIC AND LUBRICATING OIL STORAGE TANKS (PORT KC PROPERTY)
- SWMU 25 - ROLL SHOP DRUM STORAGE AREA (PIEA PROPERTY)
- SWMU 26 - ROD MILL DRUM STORAGE AREA (PIEA PROPERTY)
- SWMU 27 - BAR JOIST BUILDING HAZARDOUS WASTE STORAGE AREA (HANSEN PROPERTY)
- SWMU 33 - NAIL MILL DEGREASING AREA (RCP PROPERTY)
- SWMU 34 - WASTE OIL STORAGE AREA EAST OF GST's NO. 2 MELT SHOP (THE ANDERSONS, INC. PROPERTY)
- SWMU 35 - WASTE OIL STORAGE AREA ON NORTH SIDE OF GST's 19" MILL (THE ANDERSONS, INC. PROPERTY)
- SWMU 36 - BALL DEPARTMENT WASTE OIL STORAGE AREA (RCP PROPERTY, FORMERLY GST LEASED)
- SWMU 37 - WIRE MILL WASTE OIL STORAGE AREA (RCP PROPERTY)
- SWMU 38 - BAR JOIST TEMPORARY GREASE STORAGE AREA (HANSEN PROPERTY)
- SWMU 39 - BAR JOIST WASTE OIL AND GREASE STORAGE AREA (HANSEN PROPERTY)
- AOC 1 - ABANDONED FUEL OIL STORAGE TANK (RCP PROPERTY)
- AOC 2 - UNDERGROUND STORAGE TANKS (USTs VARIOUS OWNERSHIP)
- AOC 4 - BOILER FURNACE AREA (PORT KC PROPERTY)
- AOC 8 - "OWL GUN CLUB" SHOOTING PARK (PORT KC PROPERTY)
- AOC 9 - BOILER HOUSE (RCP PROPERTY)

**SWMUs AND AOCs NOT INCLUDED IN 1994 RCRA PART B PERMIT**

- SWMU 14 - ETCH LAB MIXING TANK (MOLY-COP USA LLC)
  - SWMU 15 - ETCH LAB HOLDING TANK (MOLY-COP USA LLC)
  - SWMU 16 - ROLL SHOP ROLL CLEANING TANK (PIEA PROPERTY)
  - SWMU 18 - BLOOMING MILL SCALE PIT (RCP PROPERTY)
  - SWMU 19 - TWELVE INCH (12") MILL SCALE PIT (CTE PROPERTY)
  - SWMU 20 - ROD MILL SCALE PIT (PIEA PROPERTY)
  - SWMU 21 - NO. 2 MELT SHOP SCALE PIT (THE ANDERSONS, INC. PROPERTY)
  - SWMU 23 - SAFETY - KLEEN UNITS
  - SWMU 28 - OUTSIDE HAZARDOUS WASTE STORAGE AREA
  - SWMU 29 - MAIN SUBSTATION PCB STORAGE AREA
  - SWMU 30 - LONG TRACTOR SHED PCB STORAGE AREA (PIEA PROPERTY)
  - SWMU 31 - SMALL TRACTOR SHED PCB STORAGE AREA (PIEA PROPERTY)
  - SWMU 32 - NO. 1 MELT SHOP PCB STORAGE AREA (RCP PROPERTY)
  - AOC 3 - ARMCO DAM/PCB EXCAVATION AREA OF BLUE RIVER (RCP PROPERTY)
  - AOC 5 - OUTFALL NO. 006 (RCP PROPERTY)
  - AOC 6 - OUTFALL NO. 042 (BLUE SUMMIT PROPERTY)
  - AOC 7 - BACKWASH AREA OF ROCK CREEK (PORT KC PROPERTY)
- Notes**
- 1 - APPROXIMATE FACILITY BOUNDARY, AS DEFINED IN PERMIT, IS SHOWN. AS INDICATED, THE FACILITY IS NO LONGER OWNED BY AK STEEL (PREDECESSOR TO ARMCO).
  - 2 - AREAS HISTORICALLY DECOMMISSIONED AND DEMOLISHED: NO. 1 MELT SHOP, ROD MILL, ROLL SHOP, AND NO. 2 MELT SHOP.
  - 3 - LOCATIONS OF SWMUS AND AOCs NOT INCLUDED IN THE 1994 RCRA PART B PERMIT ARE APPROXIMATE AND NOT BASED ON SURVEY INFORMATION. THE LOCATIONS OF THESE SWMUS AND AOCs ARE BASED UPON FIG. 6 OF THE RCRA FACILITY ASSESSMENT (TETRA TECH, 1992).
  - 4 - ONLY OUTFALLS IDENTIFIED IN THE RCRA FACILITY ASSESSMENT ARE INCLUDED ON THIS FIGURE.
  - 5 - THE LOCATIONS OF SWMUS 23, 28, AND 29 ARE UNKNOWN.

**Legend**

- OUTFALL
- AOC BOUNDARY
- SWMU BOUNDARY
- LOCATION OF FORMER USTs BELONGING TO AOC 2
- PORT AUTHORITY OF KANSAS CITY (PORT KC) PROPERTY
- THE ANDERSONS, INC. PROPERTY (FORMERLY GST)
- ROSS CUSTOMS PROPERTY LLC (RCP) PROPERTY
- HANSEN PROPERTY DEVELOPMENT, INC. (FORMERLY GST) D.B.A. U-PICK-IT OF KANSAS CITY
- CTE PROPERTIES LLC OR CTE PROPERTIES II LLC (FORMERLY GST) D.B.A. CUSTOM TRUCK & EQUIPMENT
- MOLY-COP USA LLC (FORMERLY GST)
- BLUE SUMMIT LLC (FORMERLY GST)
- PLANNED INDUSTRIAL EXPANSION AUTHORITY (PIEA) PROPERTY (FORMERLY GST) D.B.A. MIDWEST SCRAP MANAGEMENT



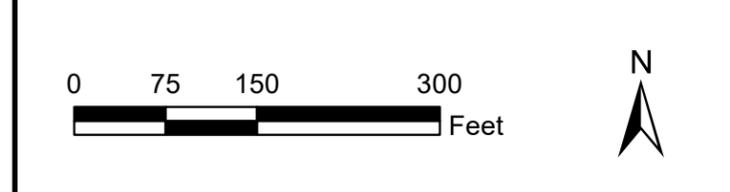
**Figure 1-2**  
**RCRA Facility Ownership Map**  
 Former Armco KC Works  
 Kansas City, Missouri

Source = ESRI and Burns & McDonnell Engineering Company, Inc.

Path: Z:\Clients\ENSR\ROSSCUS\TOM\106603\_RCP-S\WandG\WStudies\Geospatial\Docs\Figure 3-1\_Monitoring Well Network.mxd  
COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.

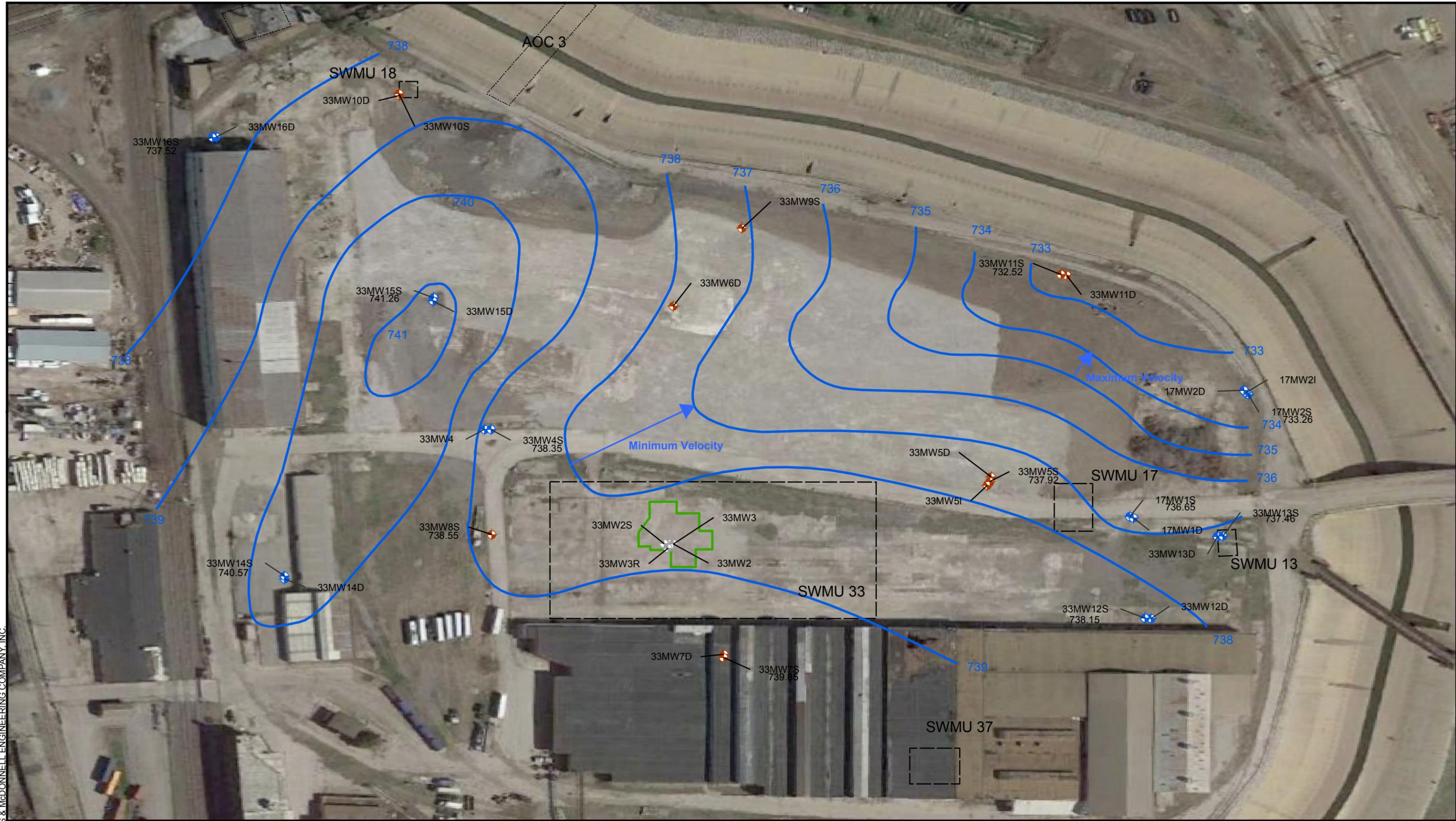


Legend	
	Monitoring Well - To Be Abandoned
	Monitoring Well - Sample / Piezometric Measurements
	Former Monitoring Well
	AOC Boundary
	SWMU Boundary
	Excavation Area



**Figure 1-3**  
**SWMU 33 Map**  
Ross Custom Properties  
Kansas City, MO

Path: Z:\Clients\ENR\ROSSCUSTOM\106603\_RCP-S\WandGIS\Studies\Geospatial\Deliverables\Maps\Figure 3-2\_Shallow\_Potentiometric Surface Map.mxd  
 COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.



<b>Legend</b>	
Monitoring Well - To Be Abandoned	AOC Boundary
Monitoring Well - Sample / Piezometric Measurements	SWMU Boundary
Former Monitoring Well	Excavation Area
Potentiometric Surface	

**Notes**  
 Water level measurements for potentiometric surface collected on December 3, 2018

0 75 150 300 Feet

Source: ESRI and Burns & McDonnell Engineering.



**Figure 3-1**  
**Shallow Potentiometric Surface Map**  
 Ross Custom Properties  
 Kansas City, MO

Path: Z:\Clients\ENR\ROSSCUSTOM\106603\_RCP-S\WandGIS\Studies\Geospatial\Deliverables\Maps\Figure 3-3\_Deep\_Potentiometric Surface\_Map.mxd  
 COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.



Legend	
	Monitoring Well - To Be Abandoned
	Monitoring Well - Sample / Piezometric Measurements
	Former Monitoring Well
	Potentiometric Surface
	AOC Boundary
	SWMU Boundary
	Excavation Area

**Notes**  
 Water level measurements for potentiometric surface collected on December 3, 2018

0 75 150 300 Feet

N



**Figure 3-2**  
**Deep Potentiometric Surface Map**  
 Ross Custom Properties  
 Kansas City, MO

Path: Z:\Clients\ENSI\ROSS\CUSTOM\106603\_RCP-SWandGWStudies\Geospatial\Deliverables\Maps\Figure 3-1\_Monitoring Well Location Map.mxd  
 COPYRIGHT © 2018 BURNS & McDONNELL ENGINEERING COMPANY, INC.



**Legend**

- ◆ Monitoring Well - To Be Abandoned
- ◆ Monitoring Well - Sample / Piezometric Measurements
- ◆ Former Monitoring Well
- AOC Boundary
- SWMU Boundary

DCE - cis-1,2-Dichloroethene  
 TCE - Trichloroethene  
 VC - Vinyl chloride  
 Units are micrograms per liter (ug/L).  
 Detections are **bold**.  
 Blue - Media Cleanup Standard exceedance.



**Figure 4-1**  
**Chlorinated VOC Results**  
 Ross Custom Properties  
 Kansas City, MO

Source: ESRI and Burns & McDonnell Engineering.

**APPENDIX A**

**Field Logbook and Monitoring Well Sampling Field Data Sheets**

# FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/4/18 SITE: Ross PID READING at WELL HEAD (ppm): \_\_\_\_\_

PROJECT NUMBER: 100603 WEATHER: Snow 31°F, Wind N 10 mph

WELL NUMBER 33 MW055

DEPTH TO WATER (ft): 8.26



TOTAL DEPTH (ft): 18.37 WELL DIAMETER (inches): 2

**PURGING**

CASING VOLUME CALCULATION: 9.91 ft of water X .16 gallons/foot = 1.586 total gallons/casing volume

Equipment Used: Dedicated Bladder Pump  Nondedicated Bladder Pump  Bailor  Other \_\_\_\_\_

Time (24 hr)	Amount Purged (gals)	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
7:25	I	160	7.11	9.33	0.864	<del>25</del>	-41.2	15.41	8.26
11:30	.1321	160	7.08	10.01	0.861	25	-39.7	14.87	8.40
11:35	.2442	160	7.03	10.09	0.867	25	-39.9	14.81	8.39
11:40	.3903	160	7.06	10.28	0.879	25	-40.0	12.25	8.26
11:45	.5289	160	7.03	10.20	0.881	25	-40.2	10.03	8.31
<del>11:50</del> 11:50	.6605	160	7.02	9.76	0.869	25	-39.3	9.56	8.36
11:55	.826	100	7.03	9.61	0.857	25	-40.1	9.57	8.36
12:00	.9247	160	7.04	9.57	0.854	25	-40.2	9.59	8.36

Continued on back (circle one) yes /  no

**SAMPLING**

Equipment Used: Same as above Other \_\_\_\_\_

Sample Time (24 hr)	Total Purged (gals)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
12:00	.9247	7.04	9.57	0.854	25	-40.2	9.59	8.36	

FINAL DEPTH TO WATER (ft TOC): 8.36 TIME FINAL DEPTH TAKEN: 12:07

SAMPLE ID: 33 MW5/6W01 SAMPLE ID FOR QC: -

PARAMETERS REQUESTED FOR ANALYSIS: VOL, TOL, MEE, NO2, NO3, SO4, SO, MN

FERROUS IRON (mg/L): \_\_\_\_\_ IDW TOTAL: .9247 GAL / 3.5 ✓

METER MODEL No.: YSI 556

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS: \_\_\_\_\_

PREPARED: DAY BAKER SIGNATURE: [Signature] DATE: 12/4/18  
 REVIEWED: \_\_\_\_\_

# FIELD GROUND-WATER SAMPLING REPORT

11321 gal/min

DATE: 12/4/18 SITE: Ross PID READING at WELL HEAD (ppm):       

PROJECT NUMBER: 106603 WEATHER: Snow 31°F Wind N10mph

WELL NUMBER 33MWSI

DEPTH TO WATER (ft): 8.11



TOTAL DEPTH (ft): 91.24 WELL DIAMETER (inches): 2

**PURGING**

CASING VOLUME CALCULATION: ~~2.4~~ <sup>53.13</sup> ft of water X .16 gallons/foot = 5.30 total gallons/casing volume

Equipment Used: Dedicated Bladder Pump  Non-dedicated Bladder Pump  Bailer  Other

Time (24 hr)	Amount Purged (gals)	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
0940	I	150	6.80	12.28	1.140	6.4	-29.1	10.36	8.72
0945	1.198	150	6.77	12.28	1.177	5.35	+52.6	6.28	8.88
0950	.296	100	6.78	11.09	1.127	5.41	-65.0	6.16	8.92
0955	.4281	160	6.81	10.22	1.088	5.46	-62.3	4.94	8.91
1000	.5302	100	6.83	10.20	1.097	5.39	-62.6	4.89	8.91
1005	1.623	160	6.81	10.09	1.081	5.34	-62.8	4.77	8.91
1010	.7944	160	6.80	10.07	1.078	5.32	-63.1	4.38	8.91
1015	8265	160	6.80	10.08	1.079	5.30	-63.2	4.31	8.91
							-62.9	4.32	8.91

Continued on back (circle one) yes / no

**SAMPLING**

Equipment Used: Same as above Other

Sample Time (24 hr)	Total Purged (gals)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
1015	.8265	6.80	10.08	1.078	5.30	-62.9	4.32	8.91	

FINAL DEPTH TO WATER (ft TOC): 8.91 TIME FINAL DEPTH TAKEN: 1040

SAMPLE ID: 33MWSI/GW01 SAMPLE ID FOR QC: 33MWS5/1000/GW01

PARAMETERS REQUESTED FOR ANALYSIS: NO<sub>2</sub>, TOC, MEG, NO<sub>3</sub>, NO<sub>3</sub>, SO<sub>4</sub>, SO<sub>3</sub>, MN

FERROUS IRON (mg/L): \_\_\_\_\_ IDW TOTAL: .8265 gal / 3.1 L

METER MODEL No.: YSE 556

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS: \_\_\_\_\_

	NAME	SIGNATURE	DATE
REPAIRED:	<u>Rax Baker</u>	<u>Dy Bl</u>	<u>12/4/18</u>
VIEWED:	_____	_____	_____

## FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/4/2018 SITE: Ross Custom Properties (AK STEEL) PID READING at WELL HEAD (ppm): -

PROJECT NUMBER: 106603 WEATHER: OVERCAST, BELOW FREEZING, WIND FROM NW

WELL NUMBER

DEPTH TO WATER (ft): 23.72

33MW5D

TOTAL DEPTH (ft): \_\_\_\_\_ WELL DIAMETER (inches): 2

PURGING

CASING VOLUME CALCULATION: \_\_\_\_\_ ft of water X \_\_\_\_\_ gallons/ = \_\_\_\_\_ total gallons/casing volume  
in casing foot

Equipment Used: Dedicated Bladder Pump Nondedicated Bladder Pump Bailer Other \_\_\_\_\_

Time (24 hr)	Amount Purged (gals)	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
1340	5	175 mL	7.09	10.49	0.763	2339	-15.9	18.91	23.72
1345	.2311	175	7.12	10.66	0.708	2322	-16.4	18.10	22.5
1350	.4622	175	7.19	11.00	0.761	2049	-27.4	15.23	22.19
1355	.6933	175	7.20	10.98	0.793	1921	-31.2	14.90	22.23
1400	.9244	175	7.13	10.96	0.903	1708	-34.1	14.33	22.94
1405	1.1555	175	7.15	10.91	0.926	1246	-38.0	13.24	22.61
1410	1.3866	175	7.13	10.93	0.888	851	-47.0	12.24	22.62
1415	1.6177	175	7.09	11.08	0.901	615	-51.8	11.76	22.65
1420	1.8488	175	7.07	12.57	1.129	75	-63.1	10.46	22.66

Continued on back (circle one) yes / no

SAMPLING

Equipment Used: Same as above Other \_\_\_\_\_

Sample Time (24 hr)	Total Purged (gals)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
1435	2.6421	7.03	13.77	1.327	38	-76.0	9.34	22.64	

FINAL DEPTH TO WATER (ft TOC): 22.66 TIME FINAL DEPTH TAKEN: 1425

SAMPLE ID: 33MWS0/6W01 SAMPLE ID FOR QC: \_\_\_\_\_

PARAMETERS REQUESTED FOR ANALYSIS: VOL, TOL, MEE, NO2, NO3, SO4, SG, Mn

FERROUS IRON (mg/L): \_\_\_\_\_ IDW TOTAL: 2.6421 gal/10.0 L

METER MODEL No.: YST 556

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS: \_\_\_\_\_

NAME: Dax Bardo SIGNATURE: [Signature] DATE: 12/4/18

PREPARED: \_\_\_\_\_ REVIEWED: \_\_\_\_\_



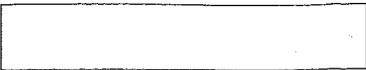
# FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/15/18 SITE: Ross PID READING at WELL HEAD (ppm): \_\_\_\_\_

PROJECT NUMBER: 106603 WEATHER: Sunny, Cloudy, 35-45°, Wind from NW

WELL NUMBER 33MW60

DEPTH TO WATER (ft): 30.34



TOTAL DEPTH (ft): 71.29 WELL DIAMETER (inches): 2

**PURGING**

CASING VOLUME CALCULATION 40.95 ft of water X 16 gallons/ft = 6.552 total gallons/casing volume  
in casing foot

Equipment Used: Dedicated Bladder Pump Nondedicated Bladder Pump Bailer Other \_\_\_\_\_

Time (24 hr)	Amount Purged (gals) <sup>L</sup>	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
1235	<u>±</u>	<u>200</u>	<u>7.18</u>	<u>14.69</u>	<u>1.509</u>	<u>15.1</u>	<u>-52.7</u>	<u>12.91</u>	<u>30.34</u>
1240	<u>1</u>	<u>200</u>	<u>7.32</u>	<u>15.16</u>	<u>1.577</u>	<u>10.82</u>	<u>-72.7</u>	<u>14.31</u>	<u>29.75</u>
1245	<u>2</u>	<u>200</u>	<u>7.46</u>	<u>15.50</u>	<u>1.651</u>	<u>11.61</u>	<u>-82.5</u>	<u>16.96</u>	<u>29.77</u>
1250	<u>3</u>	<u>200</u>	<u>7.46</u>	<u>15.48</u>	<u>1.634</u>	<u>11.90</u>	<u>-80.9</u>	<u>17.03</u>	<u>30.06</u>
1255	<u>4</u>	<u>200</u>	<u>7.43</u>	<u>15.47</u>	<u>1.636</u>	<u>11.90</u>	<u>-78.7</u>	<u>16.31</u>	<u>30.21</u>
1300	<u>5</u>	<u>200</u>	<u>7.44</u>	<u>15.46</u>	<u>1.629</u>	<u>11.87</u>	<u>-77.9</u>	<u>16.27</u>	<u>30.20</u>
1305	<u>6</u>	<u>200</u>	<u>7.45</u>	<u>15.46</u>	<u>1.628</u>	<u>11.8</u>	<u>-77.4</u>	<u>16.25</u>	<u>30.20</u>
1310									

Continued on back (circle one) yes / no

**SAMPLING**

Equipment Used: Same as above Other \_\_\_\_\_

Sample Time (24 hr)	Total Purged (gals) <sup>L</sup>	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
1305	<u>6</u>	<u>7.43</u>	<u>15.46</u>	<u>1.628</u>	<u>11.8</u>	<u>-77.4</u>	<u>16.25</u>	<u>30.20</u>	

FINAL DEPTH TO WATER (ft TOC): 30.20 TIME FINAL DEPTH TAKEN: 1310

SAMPLE ID: 33MW60/6201 SAMPLE ID FOR QC: \_\_\_\_\_

PARAMETERS REQUESTED FOR ANALYSIS: VOC, TOC, MEG, NO<sub>2</sub>, NO<sub>3</sub>, SO<sub>4</sub>, SO<sub>3</sub>, Mn

FERROUS IRON (mg/L): \_\_\_\_\_ IDW TOTAL: 6 L

METER MODEL No.: YSI 556

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS: \_\_\_\_\_

NAME: Dax Baker SIGNATURE: Dax Baker DATE: 12/15/18

PREPARED: \_\_\_\_\_

REVIEWED: \_\_\_\_\_

## FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/14/18 SITE: Ross PID READING at WELL HEAD (ppm):       

PROJECT NUMBER: 106603 WEATHER: Snow 30°F Nwind 10mph

WELL NUMBER 33 MW 75

DEPTH TO WATER (ft): 6.74



TOTAL DEPTH (ft): 20.54 WELL DIAMETER (inches): 2

**PURGING**

CASING VOLUME CALCULATION: 14 ft of water X .16 gallons/ft = 2.24 total gallons/casing volume  
in casing foot

Equipment Used: Dedicated Bladder Pump    Nondedicated Bladder Pump    Bailer    Other       

Time (24 hr)	Amount Purged (gals)	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
1520	I	100	7.38	10.53	0.886	11	-31.5	17.04	6.69
1525	.1321	100	7.24	11.73	0.894	11	-26.4	2.74	7.41
1530	.2692	100	7.11	12.32	0.951	11	-21.7	5.61	7.52
1535	.3963	100	7.09	12.96	0.956	10	-23.6	5.53	7.55
1540	.5234	100	7.08	13.09	0.959	10	-25.2	3.53	7.55
1545	.6605	100	7.08	13.12	0.961	10	-27.4	3.09	7.55
1550	.7926	100	7.07	13.13	0.959	10	-28.8	2.88	7.55
Continued on back (circle one) yes / no									

**SAMPLING**

Equipment Used: Same as above    Other       

Sample Time (24 hr)	Total Purged (gals)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
1550	.7926	7.07	13.13	0.959	10	-23.8	2.88	7.55	

FINAL DEPTH TO WATER (ft TOC): 7.55 TIME FINAL DEPTH TAKEN: 1555

SAMPLE ID: 33MW75/6W01 SAMPLE ID FOR QC:       

PARAMETERS REQUESTED FOR ANALYSIS: VOL, TOL, MBE, NO<sub>2</sub>, NO<sub>3</sub>, SO<sub>4</sub>, SO<sub>3</sub>, MN

FERROUS IRON (mg/L):        IDW TOTAL: 0.7926 gal / 3 L

METER MODEL No.: YSI 5510

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS:       

NAME: DAY BAKER SIGNATURE: [Signature] DATE: 12/14/18

PREPARED: \_\_\_\_\_  
REVIEWED: \_\_\_\_\_

# FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/4/18 SITE: Ross PID READING at WELL HEAD (ppm): \_\_\_\_\_

PROJECT NUMBER: 106603 WEATHER: SNOW 30°F N wind 10mph

WELL NUMBER 33MW72 DEPTH TO WATER (ft): 23.19



TOTAL DEPTH (ft): 68.87 WELL DIAMETER (inches): 2

**PURGING**

CASING VOLUME CALCULATION: 45.60 ft of water X 16 gallons/ft = 730.88 total gallons/casing volume  
in casing foot

Equipment Used: Dedicated Bladder Pump  Nondedicated Bladder Pump  Bailer  Other \_\_\_\_\_

Time (24 hr)	Amount Purged (gals)	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
11010	±	200	7.23	8.98	0.850	6.5	-55.7	16.04	23.19
11015	.2641	200	7.22	10.54	0.909	6.7	-72.0	11.60	23.44
11020	1.5282	200	7.15	12.54	0.977	6.4	-94.1	6.85	23.42
11025	.7923	200	7.09	12.48	1.027	6.5	-104.1	4.98	23.39
11030	1.0564	200	7.06	12.23	1.056	6.2	-106.2	4.45	23.40
11035	1.3205	200	7.08	12.11	1.109	6.0	-109.7	4.10	23.20
11040	1.5846	200	7.09	11.64	1.103	5.9	-110.7	4.38	23.23

Continued on back (circle one) yes / no

**SAMPLING**

Equipment Used: Same as above Other \_\_\_\_\_

Sample Time (24 hr)	Total Purged (gals)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
11045	1.5846	7.09	11.56	1.118	6.0	-108.8	4.23	23.21	

FINAL DEPTH TO WATER (ft TOC): 23.23 TIME FINAL DEPTH TAKEN: 11047

SAMPLE ID 33MW72/GW01 SAMPLE ID FOR QC: \_\_\_\_\_

PARAMETERS REQUESTED FOR ANALYSIS: VOL, TOC, MET, NO2, NO3, SO4, SO3, MN

FERROUS IRON (mg/L): \_\_\_\_\_ IDW TOTAL: 1.5846 gal / 6 L

METER MODEL No.: SI 536

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS: \_\_\_\_\_

NAME: DAY BAKER SIGNATURE: Day Baker DATE: 12/4/18

PREPARED: \_\_\_\_\_ REVIEWED: \_\_\_\_\_

# FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/5/18 SITE: Ross Custom PID READING at WELL HEAD (ppm): -

PROJECT NUMBER: 106603 WEATHER: Sunny cloudy, 35-45°, wind from NW

WELL NUMBER 33MW85

DEPTH TO WATER (ft): 9.04



TOTAL DEPTH (ft): 16.89 WELL DIAMETER (inches): 2

**PURGING**

CASING VOLUME CALCULATION: 7.8 ft of water X 16 gallons/ft = 124.8 total gallons/casing volume  
in casing foot

Equipment Used: Dedicated Bladder Pump (Nondedicated Bladder Pump) Bailer Other \_\_\_\_\_

Time (24 hr)	Amount Purged (gals) L	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
1120	I	150	7.06	14.17	1.306	81.8	-12.4	9.47	9.04
1125	.75	150	7.08	14.59	1.316	22	-9.0	9.14	9.27
1130	1.5	150	7.10	15.08	1.333	20	-4.9	9.35	9.35
1135	2.25	150	7.08	15.18	1.343	19	-2.5	9.33	9.35
1140	3	150	7.07	15.26	1.360	16	-0.2	9.36	9.40
1145	3.75	150	7.06	15.70	1.375	15	4.5	9.38	9.41
1150	4.5	150	7.07	15.73	1.379	14	9.6	9.26	9.41
1155	5.25	150	7.03	15.81	1.385	13	7.8	9.19	9.41

Continued on back (circle one) yes / no

**SAMPLING**

Equipment Used: Same as above Other \_\_\_\_\_

Sample Time (24 hr)	Total Purged (gals) L	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
1155	5.25	7.03	15.81	1.385	13	4.8	9.19	9.41	-

FINAL DEPTH TO WATER (ft TOC): 9.41 TIME FINAL DEPTH TAKEN: 1201

SAMPLE ID: 33MW85/6W01 SAMPLE ID FOR QC: 33MW8-1000/6W01

PARAMETERS REQUESTED FOR ANALYSIS: VOC, TOC, MEE, NO<sub>2</sub>, NO<sub>3</sub>, SO<sub>4</sub>, SO<sub>2</sub>, Mn

FERROUS IRON (mg/L): \_\_\_\_\_ IDW TOTAL: 5.25 L

METER MODEL No.: YSI 556

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS: \_\_\_\_\_

NAME: Dax Baker SIGNATURE: Dax Baker DATE: 12/5/18

PREPARED: \_\_\_\_\_ REVIEWED: \_\_\_\_\_

# FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/5/18 SITE: RCCS PID READING at WELL HEAD (ppm):     

PROJECT NUMBER: 106603 WEATHER: Sunny 35°F wind WNW 5mph

WELL NUMBER 33 MW 115 DEPTH TO WATER (ft): 7.55



TOTAL DEPTH (ft): 17.79 WELL DIAMETER (inches): 2

**PURGING**

CASING VOLUME CALCULATION: 10.19 ft of water X .16 gallons/foot = 1.6304 total gallons/casing volume

Equipment Used: Dedicated Bladder Pump  Nondedicated Bladder Pump  Bailer  Other

Time (24 hr)	Amount Purged (gals)	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
0910	I	150	7.16	13.03	0.506	51	52.9	9.60	7.55
0915	.75	150	7.19	14.10	0.517	47	74.6	7.52	7.85
0920	1.5	150	7.22	14.67	0.524	41	27.3	6.05	8.29
0925	2.25	150	7.28	15.11	0.539	13.7	-35.7	4.85	8.71
0930	3	150	7.39	15.01	0.542	11.1	-39.5	3.98	8.65
0935	3.75	150	7.40	14.83	0.539	10.9	-42.5	3.91	8.65
0940	4.5	150	7.43	14.80	0.527	9.6	-47.1	3.74	8.65

Continued on back (circle one) yes / no

**SAMPLING** Equipment Used: Same as above Other

Sample Time (24 hr)	Total Purged (gals)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
<del>0940</del> 0945	4.5	7.43	14.80	0.527	9.6	-47.1	3.74	8.65	

FINAL DEPTH TO WATER (ft TOC): 8.65 TIME FINAL DEPTH TAKEN: 0940 0947

SAMPLE ID: 33MW115/6061 SAMPLE ID FOR QC:     

PARAMETERS REQUESTED FOR ANALYSIS: VOC, TOL, MEE, NO2, NO3, SO4, SO3, Mn

FERROUS IRON (mg/L):      IDW TOTAL: 4.5 L

METER MODEL No.: YSI 556

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS:     

PREPARED: Pax Baker SIGNATURE: [Signature] DATE: 12/5/18

REVIEWED:

## FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/5/18 SITE: 2055 PID READING at WELL HEAD (ppm): \_\_\_\_\_

PROJECT NUMBER: 106003 WEATHER: Sunny 37°F wind WNW 5-10 mph

WELL NUMBER 33MW11D

DEPTH TO WATER (ft): 18.53



TOTAL DEPTH (ft): 60.83 WELL DIAMETER (inches): 2

**PURGING**

CASING VOLUME CALCULATION: 42.3 ft of water X 16 gallons/foot = 676.8 total gallons/casing volume

Equipment Used: Dedicated Bladder Pump  Nondedicated Bladder Pump  Bailor  Other \_\_\_\_\_

Time (24 hr)	Amount Purged (gals)	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
1015	I	225	7.40	13.08	2.395	21	-90.4	12.64	18.53
1020	1.125	225	7.60	14.08	3.215	22	-127.9	4.31	18.58
1025	2.25	225	7.72	14.09	3.179	22	-124.7	3.91	18.55
1030	3.375	225	7.70	14.08	3.215	39	-130.0	3.38	18.57
1035	4.5	225	7.69	13.67	3.230	20	-132.5	2.56	18.55
1040	5.625	225	7.70	13.74	3.234	19	-132.0	2.27	18.54
1045	6.75	225	7.69	13.74	3.241	19	-132.6	2.19	18.54
Continued on back (circle one) yes / no									

**SAMPLING**

Equipment Used: Same as above Other \_\_\_\_\_

Sample Time (24 hr)	Total Purged (gals)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
1045	6.75	7.69	13.74	3.241	19	-132.6	2.19	18.54	

FINAL DEPTH TO WATER (ft TOC): 18.55 TIME FINAL DEPTH TAKEN: 1050

SAMPLE ID: 33MW11D/6W01 SAMPLE ID FOR QC: \_\_\_\_\_

PARAMETERS REQUESTED FOR ANALYSIS: VOC, TOC, MBE, NO2, NO3, SO4, SO3, MW

FERROUS IRON (mg/L): \_\_\_\_\_ IDW TOTAL: 6.75

METER MODEL No.: YSI 556

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS: \_\_\_\_\_

PREPARED: Don Baker SIGNATURE: [Signature] DATE: 12/5/18

REVIEWED: \_\_\_\_\_

## FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/15/2018 SITE: Ross Custom PID READING at WELL HEAD (ppm):           

PROJECT NUMBER: 106603 WEATHER: partly cloudy, 35-45°, wind from NW

WELL NUMBER: 33MW165 DEPTH TO WATER (ft): 16.20

TOTAL DEPTH (ft): 27.93 WELL DIAMETER (inches): 2

**PURGING**

CASING VOLUME CALCULATION:            ft of water X            gallons/ft = 1.86 total gallons/casing volume

Equipment Used: Dedicated Bladder Pump (circled) Nondedicated Bladder Pump Bailer Other           

Time (24 hr)	Amount Purged (gals)	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
1340	.5	100	7.43	12.90	0.628	41.8	-10.9	13.31	17.18
1345	1	100	7.39	13.22	0.627	36.6	-6.7	11.10	17.34
1350	1.5	100	7.34	13.25	0.626	34.1	-5.1	10.47	18.12
1355	2	100	7.33	13.40	0.637	28.4	-9.9	9.72	18.04
1400	2.5	100	7.35	13.44	0.641	24.4	-12.0	8.75	18.00
1405	3.0	100	7.37	13.51	0.634	21.6	-13.1	8.74	18.01
1410	3.5	100	7.38	13.53	0.632	20.9	-13.9	8.76	18.01

Continued on back (circle one) yes / no

**SAMPLING**

Equipment Used: Same as above Other           

Sample Time (24 hr)	Total Purged (gals)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
1410	3.5	7.38	13.53	0.632	20.9	73.9	8.76	18.01	

FINAL DEPTH TO WATER (ft TOC): 18.01 TIME FINAL DEPTH TAKEN: 1417

SAMPLE ID: 33MW165/6201 SAMPLE ID FOR QC:           

PARAMETERS REQUESTED FOR ANALYSIS: VOC, TOC, MEE, NO2, NO3, SO4, SO3, Mn

FERROUS IRON (mg/L):            IDW TOTAL: 3.5L

METER MODEL No.: YSI 556

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS:           

	NAME	SIGNATURE	DATE
PREPARED:	<u>Dex Baker</u>	<u>[Signature]</u>	<u>12/15/18</u>
REVIEWED:			

# FIELD GROUND-WATER SAMPLING REPORT

DATE: 12/5/18 SITE: ROSS PID READING at WELL HEAD (ppm): \_\_\_\_\_

PROJECT NUMBER: 106603 WEATHER: Scattered Cloudy, 35-45°, Wind from NW

WELL NUMBER B3 MW/6D

DEPTH TO WATER (ft): 31.58



TOTAL DEPTH (ft): 77.20 WELL DIAMETER (inches): 2

PURGING

CASING VOLUME CALCULATION: \_\_\_\_\_ ft of water X 16 gallons/foot = 7.3952 total gallons/casing volume

Equipment Used: Dedicated Bladder Pump  Nondedicated Bladder Pump  Bailer  Other \_\_\_\_\_

Time (24 hr)	Amount Purged (gals)	Flow Rate (ml/min)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)
1435	0.75	150	7.27	14.09	1,183	21	-56.3	14.31	31.58
1440	1.5	150	7.27	14.31	1,228	20	-76.0	8.12	31.62
1445	2.25	150	7.31	14.62	1,253	18	-91.4	5.26	31.67
1450	3.0	150	7.31	14.80	1,262	18	-102.6	3.62	31.70
1455	3.75	150	7.32	14.89	1,265	17	-106.8	3.11	31.71
1500	4.25	150	7.32	14.91	1,267	16	-108.3	2.84	31.73
1505	5.0	150	7.33	14.93	1,266	15	-109.5	2.74	31.72
1510	5.75	150	7.33	14.94	1,269	15	-109.7	2.71	31.72
1515	6.25	150	7.32	14.94	1,268	15	-109.8	2.70	31.72

Continued on back (circle one) yes / no

SAMPLING Equipment Used: Same as above Other \_\_\_\_\_

Sample Time (24 hr)	Total Purged (gals)	pH	Temp (C)	Conductivity (mmhos/cm)	Turbidity (NTUs)	ORP (mV)	D.O. (mg/L)	Depth to Water (ft TOC)	Obs.
1515	6.25	7.32	14.94	1,268	15	-109.8	2.70	31.72	-

FINAL DEPTH TO WATER (ft TOC): 31.72 TIME FINAL DEPTH TAKEN: 1520

SAMPLE ID: B3 MW/6D/01 SAMPLE ID FOR QC: \_\_\_\_\_

PARAMETERS REQUESTED FOR ANALYSIS: VOL, TOL, MEE, NO<sub>2</sub>, NO<sub>3</sub>, SO<sub>4</sub>, SO<sub>3</sub>, MN

FERROUS IRON (mg/L): \_\_\_\_\_ IDW TOTAL: 6.25 L

METER MODEL No.: VE 556

CHECKED FLOW THROUGH CELL FOR LEAKS:  COMMENTS: \_\_\_\_\_

PREPARED: Dix Baker SIGNATURE: Dix Baker DATE: 12/5/18

REVIEWED: \_\_\_\_\_

2 12/3/2018

106603

C. Balkenbush  
D. Barge

WEATHER: Wind from North, 30-44°, Overcast

TASK: WATER LEVELS + GW SAMPLES

PERSONNEL: Chuck Balkenbush + Dax Barge

0815 LEAVE BFM OFFICE FOR A-1 DRUM

0845 ARRIVE AT A1 DRUM

0915 LEAVE FOR SITE

0945 ARRIVE ON SITE

- PULLED UP PAPER TOWELS ON THE

WAY IN

1006 START WATER LEVELS

WELL ID	WL	TD	Obs.
17MW2D	22.79	62.16	
17MW2I	<del>10.88</del> 8.88	39.85	
17MW2S	8.74	18.77	
17MW1S	7.79	18.85	
17MW1	21.83	67.18	
33MW13S	unable to open well cover	7.33	17.73
33MW13D	unable to open well cover	22.18	68.20
33MW12S	unable to open well cover	8.09	17.12
33MW12D	unable to open well cover	22.92	68.65
33MW5I	8.11	41.24	
33MW5S	8.46	18.37	
33MW5D	under water ~ 3"	23.70	68.74
33MW7S	6.74	20.54	
33MW7D	23.33	68.87	

12/3/2019

106603

C. Balkenbush  
D. Barge 3

WELL ID	WL	TD	Obs.
33MW8S	8.53	16.84	
33MW14S	7.95	18.16	
33MW14D	<del>26.62</del> 26.92	70.10	well cover broken, soft bottom
33MW4	26.32	70.10	
33MW4S	9.56	17.44	well cover need replace, soft bottom
33MW4D	<del>26.32</del>	70.10	
33MW15S	11.92	27.03	
33MW15D	31.88	86.75	soft bottom
33MW16S	16.0	27.83	tree on top of well
33MW16D	31.85	77.80	
33MW10S	unable to locate presumed cover		
33MW10D	unable to locate presumed cover		
33MW9S	-	-	DESTROYED (COVER BROKEN)
33MW6D	30.23	71.29	
33MW11S	7.22	17.74	
33MW11D	18.54	60.83	
1550:	off-site		
1635:	Arrive at BMCD		
1650:	Meet with Sharon S. about field activities for tomorrow (12-14/18)		
1900:	End of day		

Dax Barge  
12/3/18

Rite in the rain

12/14/18

Ross GW Sampling

Chuck B.  
D. Baker

Tuesday December 4 2018

Weather 31°F, Snowy, wind N 10 mph

Personnel: D. Baker, C. Balkenbush

Task: GW Sampling (low flow)

0730: Leave BMCB

0820: Buy ~5 gallons DI water

0900: on-site

0910: Stage IDW water disposal  
drum on-site in west vacant warehouse

0915: Calibrate YSI

pH: 9.0/3.99 7.0/6.92 10.0/9.96

conductivity: 1.409/1.230 DO: 10mg/L/11.55

0925: Calibrate Turbidity Meter

NTU: 0.0/0.0 10.0/10.18

0935: Set-up at 33MW5I

0940: Begin purging 33MW5I @ 150 mL/min  
WL: 8.11 TD: 41.24

1015: Collect 33MW5I/GW01 and 33MW5/1000/GW01

Field duplicate for VOCs, MEE, Mn, TOC,  
Nitrate N, Nitrite N, Sulfate, Sulfide

\* Late Entry: 1035 Collect 33MW5I Rinsate \*

1045: Decan pump + equipment

1050: Set-up at 33MW5S

1055: Begin purging <sup>(DB)</sup> 33MW5S @ 100 mL/min

1125: Begin purging 33MW5S @ 100 mL/min

1200: Collect 33MW5S/GW01 for VOCs, MEE, Mn, TOC,

Nitrate N, Nitrite N, Sulfate, Sulfide

12/14/18

Ross GW Sampling

C. Balkenbush  
D. Baker

1225: Decan pump + equipment

1335: Setup at 33MW5D

1340: Begin purging 33MW5D

1435: Collect 33MW5D/GW01 for VOC, TOC,  
Sulfate/Sulfite, MEE, Nitrate N, Nitrite N,  
Mn

1445: Decan pump + equipment

1500: Setup at 33MW7S

1515: Replace bladder on pump

1520: Begin purging 33MW7S

1550: Collect 33MW7S/GW01 for VOC, TOC,  
MEE, Mn, Sulfate/Sulfite, Nitrate/Nitrite N,

1600: Decan pump + equipment

1605: Setup at 33MW7D

1610: Begin purging 33MW7D

1645: Collect 33MW7D/GW01 for VOC, TOC,  
MEE, NO<sub>2</sub>, NO<sub>3</sub>, SO<sub>4</sub>, SO<sub>3</sub>, Mn,

1655: Decan pump + equipment

1715: Dump water IDW into on-site  
drum labeled "water IDW, Ross  
Custom Truck"

1730: off-site

1740: Buy ice for coolers + pack up  
for shipment

1800: Ship sample overnight to ALS  
via FedEx downtown KEMO

1845: Return to BMCB (end of day). 12/14/18

12/5/18

Ross GW Sampling

C. Balkenbusch  
D. Baker

Wednesday December 5 2018

Weather: Overcast 30-40°F wind WNW 10 mph

Personnel: C. Balkenbusch, D. Baker

Task: GW Sampling (low flow)

0725: Depart BMCO

0800: Buy DI water for Decon

0840: on-site

0845: Calibrate YSI multi meter

pH 4.0/3.98 7.0/7.01 10.0/10.02

conductivity 1.409 nS/cm / 1.369 nS/cm

DO: 10 mg/L / 11.1 mg/L

0900: Calibrate Turbidity meter

NTU: 0.0/0.09 10.0/9.96

0900: Set-up at 33 MWNS

0910: Begin purging 33 MWNS

0940: Collect [33 MWNS/GW01] for VOC, TOC,

~~0950~~ SO<sub>2</sub>, SO<sub>4</sub>, NO<sub>3</sub>, NO<sub>2</sub>, MEE, Mn

0950: Decon pump + equipment

1008: Set-up at 33 MW11D

1015: Begin purging 33 MW11D

1045: Collect [33 MW11D/GW01] for VOC, TOC, SO<sub>2</sub>, SO<sub>4</sub>,

NO<sub>3</sub>, NO<sub>2</sub>, MEE, Mn

1055: Decon pump + equipment

1110: Set-up at 33 MW8S

1120: Begin purging 33 MW8S

1155: Collect [33 MW8S/GW01] and [33 MW8S/GW02]

Field dup for VOC, TOC, SO<sub>2</sub>, SO<sub>4</sub>, NO<sub>3</sub>, NO<sub>2</sub>

12/5/18

Ross GW sampling

C. Balkenbusch  
D. Baker

MEE, Mn

1215: Decon pump + equipment

1230: Set-up at 33 MW6D

1235: Begin purging 33 MW6D

1305: Collect [33 MW6D/GW01] for VOC, TOC,

MEE, SO<sub>2</sub>, SO<sub>4</sub>, NO<sub>2</sub>, NO<sub>3</sub>, Mn,

1340: Decon pump + equipment

1330: Set-up at 33 MW16S

1340: Begin purging 33 MW16S

1410: Collect [33 MW16S/GW01] for VOC, TOC, SO<sub>2</sub>, SO<sub>4</sub>,

NO<sub>2</sub>, NO<sub>3</sub>, MEE, Mn

1420: Decon pump + equipment

1425: Set-up at 33 MW16D

1430: Begin purging 33 MW16D

1515: Collect [33 MW16D/GW01] for VOC, TOC, MEE,

Mn, SO<sub>2</sub>, SO<sub>4</sub>, NO<sub>2</sub>, NO<sub>3</sub>

1530: Decon pump + equipment

1540: Dump ISW water in on-site dam

~ 25 gallons

1600: off-site

1615 Buy ice for samples

Pack up coolers / samples for

shipment to ALS lab via FedEx

ship samples @ FedEx

Return to BMCO

unload truck + clean up

end of Ross GW sampling event late in the rain

## DAILY QUALITY CONTROL REPORT

Site: Ross Custom (Former AK Steel)  
 Project No: 106603  
 Date: 3-Dec-18  
 Crew No: 2  
 Crew Mem: Chuck Balkenbusch  
Dax Baker

**Weather (circle)**

	Bright Sun	Clear	Overcast	Rain	T-storm	Snow
Temp:	>32	32-50	50-70	70-85	<85	
Wind:	Still	Gusty	Moder.	High	Direction:	N
Humidity:	Dry	Moder.	Humid			

Subcontractors and Equipment on Site: None

**Health and Safety Levels: (circle)**

D	Mod. D.	C	B	A
---	---------	---	---	---

Summary of Health and Safety Activities: Daily safety briefing

**Instrument Used: (circle)**

**Calibrated: (check)**

PID	Fe	pH	Cond.	Temp.	Turbidity	DO	ORP

For actual calibration results, see field calibration forms.

Summary of Work Performed: Water levels were obtained from wells around site that could be accessed.  
33MW5D could not be gauged due to ~3 inches of standing water over it.  
33MW10S, 33MW10D were not able to be found and most likely are underneath rubble and debris  
33MW9S was destroyed, casing was bent - picture attached  
Sampling activities will begin tomorrow

All Samples Were Collected According to Procedures Outlined in the Work Plan?

Yes \_\_\_\_\_ No \_\_\_\_\_ NA X

Problems Encountered/Corrective Action Taken: 33MW10S and 33MW10D were not able to be found.  
Ross Custom will try and remove rubble on top of wells tomorrow, if wells are not found, 33MW16S  
and 33MW16D will be used instead as outlined by Sharon Shelton.

Time Project Manager Contacted: 1005, 1615

Tomorrow's Expectations: Begin sampling

Name: Chuck Balkenbusch Signature: CB



## DAILY QUALITY CONTROL REPORT

Site: Ross Custom (Former AK Steel)  
 Project No: 106603  
 Date: 4-Dec-18  
 Crew No: 2  
 Crew Mem: Chuck Balkenbusch  
 Dax Baker

**Weather (circle)**

Bright Sun	Clear	<b>Overcast</b>	Rain	T-storm	Snow
<b>&gt;32</b>	32-50	50-70	70-85	<85	
Temp:	Still	<b>Gusty</b>	Moder.	High	Direction NW
Wind:	<b>Dry</b>	Moder.	Humid		
Humidity:					

Subcontractors and Equipment on Site: None

**Health and Safety Levels: (circle)**

<b>D</b>	Mod. D.	C	B	A
----------	---------	---	---	---

Summary of Health and Safety Activities: Daily safety briefing

**Instrument Used: (circle)**

**Calibrated: (check)**

PID	Fe	pH	Cond.	Temp.	Turbidity	DO	ORP

For actual calibration results, see field calibration forms.

Summary of Work Performed: Groundwater sampling begins, 5 wells samples with 2 QC samples. Ross Custom Properties brought equipment to try and find 33MW10S and 33MW10D and were unable to locate them. 33MW16S and 33MW16D will be sampled tomorrow as outlined by Sharon Shelton

Samples Collected	Time	Notes
33MW5I/GW01	1015	
33MW5-1000/GW01		Field Duplicate of 33MW5I
33MW5I/RW01	1035	Rinsate
33MW5S/GW01	1200	
33MW5D/GW01	1435	
33MW7S/GW01	1550	
33MW7D/GW01	1645	

All Samples Were Collected According to Procedures Outlined in the Work Plan?

Yes X No \_\_\_\_\_ NA \_\_\_\_\_

Problems Encountered/Corrective Action Taken: NA

Time Project Manager Contacted: 1005, 1615

Tomorrow's Expectations: Finish sampling

Name: Chuck Balkenbusch Signature: CB

## DAILY QUALITY CONTROL REPORT

Site: Ross Custom (Former AK Steel)  
 Project No: 106603  
 Date: 5-Dec-18  
 Crew No: 2  
 Crew Mem: Chuck Balkenbusch  
 Dax Baker

**Weather (circle)**

Bright Sun	Clear	Overcast	Rain	T-storm	Snow
Temp: >32	32-50	50-70	70-85	<85	
Wind: Still	Gusty	Moder.	High	Direction	NW
Humidity: Dry	Moder.	Humid			

Subcontractors and Equipment on Site: None

**Health and Safety Levels: (circle)**

D	Mod. D.	C	B	A
---	---------	---	---	---

Summary of Health and Safety Activities: Daily safety briefing

**Instrument Used: (circle)**

**Calibrated: (check)**

PID	Fe	pH	Cond.	Temp.	Turbidity	DO	ORP

For actual calibration results, see field calibration forms.

Summary of Work Performed: Finished groundwater sampling. Sampled remaining 6 wells and completed one field duplicate

unable to locate them. 33MW16S and 33MW16D will be sampled tomorrow as outlined by Sharon Shelton

Samples Collected	Time	Notes
33MW11S/GW01	940	
33MW11D/GW01	1045	
33MW8S/GW01	1155	
33MW8-1000/GW01		Field Duplicate of 33MW5I
33MW6D/GW01	1305	
33MW16S/GW01	1410	
33MW16D/GW01	1515	

All Samples Were Collected According to Procedures Outlined in the Work Plan?

Yes X No \_\_\_\_\_ NA \_\_\_\_\_

Problems Encountered/Corrective Action Taken: NA

Time Project Manager Contacted: \_\_\_\_\_

Tomorrow's Expectations: NA

Name: Chuck Balkenbusch Signature: CB

**APPENDIX B**

**Analytical Data for 4<sup>th</sup> Quarter 2018 Sampling Event**



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10450 Stancliff Rd. Suite 210  
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December 20, 2018

Sharon Shelton  
Burns & McDonnell  
9400 Ward Parkway  
Kansas City, MO 64114

Work Order: **HS18120251**

Laboratory Results for: **SWMU 33 LTM Groundwater**

Dear Sharon,

ALS Environmental received 8 sample(s) on Dec 06, 2018 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

A handwritten signature in cursive script that reads "Bernadette Fini".

Generated By: JUMOKE.LAWAL  
Bernadette A. Fini  
Project Manager

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**Work Order:** HS18120251

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS18120251-01	33MW5I / GW01	Groundwater		04-Dec-2018 10:15	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120251-02	33MW5-1000 / GW01 "Dup"	Groundwater		04-Dec-2018 00:00	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120251-03	33MW5S / GW01	Groundwater		04-Dec-2018 12:00	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120251-04	33MW05I / RW01	Groundwater		04-Dec-2018 10:35	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120251-05	33MW5D / GW01	Groundwater		04-Dec-2018 14:35	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120251-06	33MW7S / GW01	Groundwater		04-Dec-2018 15:50	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120251-07	33MW7D / GW01	Groundwater		04-Dec-2018 16:45	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120251-08	Trip Blank	Water	CG 101618 -237	04-Dec-2018 00:00	06-Dec-2018 09:00	<input type="checkbox"/>

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**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**Work Order:** HS18120251

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**CASE NARRATIVE**

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**GC Semivolatiles by Method RSK-175**

**Batch ID: R329493**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**GCMS Volatiles by Method SW8260**

**Batch ID: R329441**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**Metals by Method SW6020**

**Batch ID: 135559**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method SW9060**

**Batch ID: R329406**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method SM4500 S2-F**

**Batch ID: R329295**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E300**

**Batch ID: R329320**

**Sample ID: 33MW5S / GW01 (HS18120251-03)**

- Sample was received with limited holding time remaining. The analysis was performed as soon as possible after sample receipt. Results are flagged with "H" and should be considered estimated.

**Sample ID: CCV**

- The associated CCV %D was above the upper acceptance limit. The high CCV recovery does not affect the non-detect results for analyte(s): (Nitrogen, Nitrite (As N))

**Sample ID: HS18120166-01MS**

- MS and MSD are for an unrelated sample (Sulfate)

**Sample ID: WLCSW3-120518**

- The LCSD recovery was above the upper control limit. All sample results in the batch were non-detect. (Nitrogen, Nitrite (As N))

**Batch ID: R328810**

**Sample ID: 33MW5-1000 / GW01 "Dup" (HS18120251-02)**

- Sample was received with limited holding time remaining. The analysis was performed as soon as possible after sample receipt. Results are flagged with "H" and should be considered estimated.

**Sample ID: 33MW5D / GW01 (HS18120251-05)**

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**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**Work Order:** HS18120251

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**CASE NARRATIVE****WetChemistry by Method E300****Batch ID: R328810**

- Sample was received with limited holding time remaining. The analysis was performed as soon as possible after sample receipt. Results are flagged with "H" and should be considered estimated.

**Sample ID: CCV**

- The associated CCV %D was above the upper acceptance limit. The high CCV recovery does not affect the non-detect results for analyte(s): (Nitrogen, Nitrite (As N))

**Sample ID: HS18120280-01MS**

- MS and MSD are for an unrelated sample (Sulfate)

**Batch ID: R329319**

- The associated CCV %D was above the upper acceptance limit. The high CCV recovery does not affect the non-detect results for analyte(s): (Nitrogen, Nitrite (As N))

**Sample ID: 33MW5I / GW01 (HS18120251-01)**

- Sample was received with limited holding time remaining. The analysis was performed as soon as possible after sample receipt. Results are flagged with "H" and should be considered estimated.

**Sample ID: HS18120166-06MS**

- MS and MSD are for an unrelated sample (Sulfate)

**Sample ID: HS18120166-42MS**

- MS and MSD are for an unrelated sample (Sulfate)

**Sample ID: WLCSDW2-120518**

- The LCSD recovery was above the upper control limit. All sample results in the batch were non-detect. (Nitrogen, Nitrite (As N))

**Batch ID: R329653**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 
-

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW5I / GW01  
 Collection Date: 04-Dec-2018 10:15

**ANALYTICAL REPORT**  
 WorkOrder:HS18120251  
 Lab ID:HS18120251-01  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: AKP		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 03:57
1,1,2-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 03:57
1,1-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 03:57
<b>1,1-Dichloroethene</b>	<b>1.7</b>		<b>1.0</b>	<b>ug/L</b>	1	18-Dec-2018 03:57
1,2-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 03:57
Acetone	ND		2.0	ug/L	1	18-Dec-2018 03:57
Benzene	ND		1.0	ug/L	1	18-Dec-2018 03:57
Carbon disulfide	ND		2.0	ug/L	1	18-Dec-2018 03:57
Chloroform	ND		1.0	ug/L	1	18-Dec-2018 03:57
<b>cis-1,2-Dichloroethene</b>	<b>370</b>		<b>5.0</b>	<b>ug/L</b>	5	18-Dec-2018 04:24
Ethylbenzene	ND		1.0	ug/L	1	18-Dec-2018 03:57
Methylene chloride	ND		2.0	ug/L	1	18-Dec-2018 03:57
Tetrachloroethene	ND		1.0	ug/L	1	18-Dec-2018 03:57
Toluene	ND		1.0	ug/L	1	18-Dec-2018 03:57
trans-1,2-Dichloroethene	ND		5.0	ug/L	5	18-Dec-2018 04:24
Trichloroethene	ND		1.0	ug/L	1	18-Dec-2018 03:57
<b>Vinyl chloride</b>	<b>140</b>		<b>1.0</b>	<b>ug/L</b>	1	18-Dec-2018 03:57
<b>1,2-Dichloroethene, Total</b>	<b>380</b>		<b>5.0</b>	<b>ug/L</b>	5	18-Dec-2018 04:24
Xylenes, Total	ND		1.0	ug/L	1	18-Dec-2018 03:57
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>95.7</i>		<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 03:57</i>
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>91.6</i>		<i>70-126</i>	<i>%REC</i>	<i>5</i>	<i>18-Dec-2018 04:24</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.2</i>		<i>81-113</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 03:57</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.4</i>		<i>81-113</i>	<i>%REC</i>	<i>5</i>	<i>18-Dec-2018 04:24</i>
<i>Surr: Dibromofluoromethane</i>	<i>101</i>		<i>77-123</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 03:57</i>
<i>Surr: Dibromofluoromethane</i>	<i>96.9</i>		<i>77-123</i>	<i>%REC</i>	<i>5</i>	<i>18-Dec-2018 04:24</i>
<i>Surr: Toluene-d8</i>	<i>98.4</i>		<i>82-127</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 03:57</i>
<i>Surr: Toluene-d8</i>	<i>101</i>		<i>82-127</i>	<i>%REC</i>	<i>5</i>	<i>18-Dec-2018 04:24</i>
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>		Analyst: PVL		
Ethane	ND		1.00	ug/L	1	18-Dec-2018 14:25
<b>Ethene</b>	<b>17.5</b>		<b>1.00</b>	<b>ug/L</b>	1	18-Dec-2018 14:25
<b>Methane</b>	<b>1,010</b>		<b>50.0</b>	<b>ug/L</b>	100	18-Dec-2018 14:41
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>		Prep:SW3010A / 13-Dec-2018		Analyst: RPM
<b>Manganese</b>	<b>9.71</b>		<b>0.500</b>	<b>mg/L</b>	100	18-Dec-2018 13:25
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>		Analyst: KMU		
Nitrogen, Nitrate (As N)	ND	H	0.100	mg/L	1	06-Dec-2018 10:17
Nitrogen, Nitrite (As N)	ND	H	0.100	mg/L	1	06-Dec-2018 10:17
<b>Sulfate</b>	<b>256</b>		<b>5.00</b>	<b>mg/L</b>	10	20-Dec-2018 00:35
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>		Analyst: KVL		
<b>Sulfide</b>	<b>1.64</b>		<b>1.00</b>	<b>mg/L</b>	1	11-Dec-2018 17:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW5I / GW01  
 Collection Date: 04-Dec-2018 10:15

**ANALYTICAL REPORT**

WorkOrder:HS18120251  
 Lab ID:HS18120251-01  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>				Analyst: AJH
Organic Carbon, Total	4.73		1.00	mg/L	1	17-Dec-2018 16:55

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW5-1000 / GW01 "Dup"  
 Collection Date: 04-Dec-2018 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS18120251  
 Lab ID:HS18120251-02  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: AKP		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 04:48
1,1,2-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 04:48
<b>1,1-Dichloroethane</b>	<b>1.1</b>		<b>1.0</b>	<b>ug/L</b>	1	18-Dec-2018 04:48
<b>1,1-Dichloroethene</b>	<b>1.8</b>		<b>1.0</b>	<b>ug/L</b>	1	18-Dec-2018 04:48
1,2-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 04:48
Acetone	ND		2.0	ug/L	1	18-Dec-2018 04:48
Benzene	ND		1.0	ug/L	1	18-Dec-2018 04:48
Carbon disulfide	ND		2.0	ug/L	1	18-Dec-2018 04:48
Chloroform	ND		1.0	ug/L	1	18-Dec-2018 04:48
<b>cis-1,2-Dichloroethene</b>	<b>430</b>		<b>5.0</b>	<b>ug/L</b>	5	18-Dec-2018 05:14
Ethylbenzene	ND		1.0	ug/L	1	18-Dec-2018 04:48
Methylene chloride	ND		2.0	ug/L	1	18-Dec-2018 04:48
Tetrachloroethene	ND		1.0	ug/L	1	18-Dec-2018 04:48
Toluene	ND		1.0	ug/L	1	18-Dec-2018 04:48
trans-1,2-Dichloroethene	ND		5.0	ug/L	5	18-Dec-2018 05:14
Trichloroethene	ND		1.0	ug/L	1	18-Dec-2018 04:48
<b>Vinyl chloride</b>	<b>130</b>		<b>1.0</b>	<b>ug/L</b>	1	18-Dec-2018 04:48
<b>1,2-Dichloroethene, Total</b>	<b>440</b>		<b>5.0</b>	<b>ug/L</b>	5	18-Dec-2018 05:14
Xylenes, Total	ND		1.0	ug/L	1	18-Dec-2018 04:48
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>95.8</i>		<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 04:48</i>
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>95.3</i>		<i>70-126</i>	<i>%REC</i>	<i>5</i>	<i>18-Dec-2018 05:14</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.2</i>		<i>81-113</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 04:48</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>98.5</i>		<i>81-113</i>	<i>%REC</i>	<i>5</i>	<i>18-Dec-2018 05:14</i>
<i>Surr: Dibromofluoromethane</i>	<i>101</i>		<i>77-123</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 04:48</i>
<i>Surr: Dibromofluoromethane</i>	<i>96.7</i>		<i>77-123</i>	<i>%REC</i>	<i>5</i>	<i>18-Dec-2018 05:14</i>
<i>Surr: Toluene-d8</i>	<i>97.3</i>		<i>82-127</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 04:48</i>
<i>Surr: Toluene-d8</i>	<i>103</i>		<i>82-127</i>	<i>%REC</i>	<i>5</i>	<i>18-Dec-2018 05:14</i>
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>		Analyst: PVL		
<b>Ethane</b>	<b>8.60</b>		<b>1.00</b>	<b>ug/L</b>	1	18-Dec-2018 15:03
Ethene	ND		1.00	ug/L	1	18-Dec-2018 15:03
<b>Methane</b>	<b>1,260</b>		<b>50.0</b>	<b>ug/L</b>	100	18-Dec-2018 15:15
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>		Prep:SW3010A / 13-Dec-2018		Analyst: RPM
<b>Manganese</b>	<b>9.19</b>		<b>0.500</b>	<b>mg/L</b>	100	18-Dec-2018 13:27
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>		Analyst: KMU		
Nitrogen, Nitrate (As N)	ND	H	0.100	mg/L	1	06-Dec-2018 20:39
Nitrogen, Nitrite (As N)	ND	H	0.100	mg/L	1	06-Dec-2018 20:39
<b>Sulfate</b>	<b>272</b>		<b>5.00</b>	<b>mg/L</b>	10	20-Dec-2018 00:49
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>		Analyst: KVL		
Sulfide	ND		1.00	mg/L	1	11-Dec-2018 17:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW5-1000 / GW01 "Dup"  
 Collection Date: 04-Dec-2018 00:00

**ANALYTICAL REPORT**

WorkOrder:HS18120251  
 Lab ID:HS18120251-02  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>				Analyst: AJH
Organic Carbon, Total	4.86		1.00	mg/L	1	17-Dec-2018 17:11

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW5S / GW01  
 Collection Date: 04-Dec-2018 12:00

**ANALYTICAL REPORT**  
 WorkOrder:HS18120251  
 Lab ID:HS18120251-03  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>				Analyst: AKP
1,1,1-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 00:20
1,1,2-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 00:20
1,1-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 00:20
1,1-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 00:20
1,2-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 00:20
Acetone	ND		2.0	ug/L	1	18-Dec-2018 00:20
Benzene	ND		1.0	ug/L	1	18-Dec-2018 00:20
Carbon disulfide	ND		2.0	ug/L	1	18-Dec-2018 00:20
Chloroform	ND		1.0	ug/L	1	18-Dec-2018 00:20
<b>cis-1,2-Dichloroethene</b>	<b>6.4</b>		<b>1.0</b>	<b>ug/L</b>	1	18-Dec-2018 00:20
Ethylbenzene	ND		1.0	ug/L	1	18-Dec-2018 00:20
Methylene chloride	ND		2.0	ug/L	1	18-Dec-2018 00:20
Tetrachloroethene	ND		1.0	ug/L	1	18-Dec-2018 00:20
Toluene	ND		1.0	ug/L	1	18-Dec-2018 00:20
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 00:20
Trichloroethene	ND		1.0	ug/L	1	18-Dec-2018 00:20
Vinyl chloride	ND		1.0	ug/L	1	18-Dec-2018 00:20
<b>1,2-Dichloroethene, Total</b>	<b>6.4</b>		<b>1.0</b>	<b>ug/L</b>	1	18-Dec-2018 00:20
Xylenes, Total	ND		1.0	ug/L	1	18-Dec-2018 00:20
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>92.7</i>		<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 00:20</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.8</i>		<i>81-113</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 00:20</i>
<i>Surr: Dibromofluoromethane</i>	<i>102</i>		<i>77-123</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 00:20</i>
<i>Surr: Toluene-d8</i>	<i>95.3</i>		<i>82-127</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 00:20</i>
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>				Analyst: PVL
Ethane	ND		1.00	ug/L	1	18-Dec-2018 15:26
<b>Ethene</b>	<b>1.64</b>		<b>1.00</b>	<b>ug/L</b>	1	18-Dec-2018 15:26
<b>Methane</b>	<b>15.5</b>		<b>0.500</b>	<b>ug/L</b>	1	18-Dec-2018 15:26
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>			Prep:SW3010A / 13-Dec-2018	Analyst: RPM
<b>Manganese</b>	<b>12.8</b>		<b>0.500</b>	<b>mg/L</b>	100	18-Dec-2018 13:29
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>				Analyst: KMU
Nitrogen, Nitrate (As N)	ND	H	0.100	mg/L	1	06-Dec-2018 13:53
Nitrogen, Nitrite (As N)	ND	H	0.100	mg/L	1	06-Dec-2018 13:53
<b>Sulfate</b>	<b>61.3</b>		<b>0.500</b>	<b>mg/L</b>	1	06-Dec-2018 13:53
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>				Analyst: KVL
Sulfide	ND		1.00	mg/L	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>				Analyst: AJH
<b>Organic Carbon, Total</b>	<b>5.32</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 17:28

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW05I / RW01  
 Collection Date: 04-Dec-2018 10:35

**ANALYTICAL REPORT**  
 WorkOrder:HS18120251  
 Lab ID:HS18120251-04  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>				Analyst: AKP
1,1,1-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 01:57
1,1,2-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 01:57
1,1-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 01:57
1,1-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 01:57
1,2-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 01:57
Acetone	ND		2.0	ug/L	1	18-Dec-2018 01:57
Benzene	ND		1.0	ug/L	1	18-Dec-2018 01:57
Carbon disulfide	ND		2.0	ug/L	1	18-Dec-2018 01:57
Chloroform	ND		1.0	ug/L	1	18-Dec-2018 01:57
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 01:57
Ethylbenzene	ND		1.0	ug/L	1	18-Dec-2018 01:57
Methylene chloride	ND		2.0	ug/L	1	18-Dec-2018 01:57
Tetrachloroethene	ND		1.0	ug/L	1	18-Dec-2018 01:57
Toluene	ND		1.0	ug/L	1	18-Dec-2018 01:57
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 01:57
Trichloroethene	ND		1.0	ug/L	1	18-Dec-2018 01:57
Vinyl chloride	ND		1.0	ug/L	1	18-Dec-2018 01:57
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	18-Dec-2018 01:57
Xylenes, Total	ND		1.0	ug/L	1	18-Dec-2018 01:57
<i>Surr: 1,2-Dichloroethane-d4</i>	89.9		70-126	%REC	1	18-Dec-2018 01:57
<i>Surr: 4-Bromofluorobenzene</i>	96.0		81-113	%REC	1	18-Dec-2018 01:57
<i>Surr: Dibromofluoromethane</i>	99.9		77-123	%REC	1	18-Dec-2018 01:57
<i>Surr: Toluene-d8</i>	101		82-127	%REC	1	18-Dec-2018 01:57
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>				Analyst: PVL
Ethane	ND		1.00	ug/L	1	18-Dec-2018 15:37
<b>Ethene</b>	<b>1.73</b>		<b>1.00</b>	<b>ug/L</b>	1	18-Dec-2018 15:37
<b>Methane</b>	<b>3.56</b>		<b>0.500</b>	<b>ug/L</b>	1	18-Dec-2018 15:37
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>		Prep:SW3010A / 13-Dec-2018		Analyst: RPM
Manganese	ND		0.00500	mg/L	1	18-Dec-2018 13:31
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>				Analyst: KMU
Nitrogen, Nitrate (As N)	ND		0.100	mg/L	1	06-Dec-2018 10:32
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	06-Dec-2018 10:32
Sulfate	ND		0.500	mg/L	1	06-Dec-2018 10:32
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>				Analyst: KVL
<b>Sulfide</b>	<b>1.36</b>		<b>1.00</b>	<b>mg/L</b>	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>				Analyst: AJH
Organic Carbon, Total	ND		1.00	mg/L	1	17-Dec-2018 17:45

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW5D / GW01  
 Collection Date: 04-Dec-2018 14:35

**ANALYTICAL REPORT**

WorkOrder:HS18120251  
 Lab ID:HS18120251-05  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>				Analyst: AKP
1,1,1-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 02:21
1,1,2-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 02:21
1,1-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 02:21
1,1-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:21
1,2-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 02:21
Acetone	ND		2.0	ug/L	1	18-Dec-2018 02:21
Benzene	ND		1.0	ug/L	1	18-Dec-2018 02:21
Carbon disulfide	ND		2.0	ug/L	1	18-Dec-2018 02:21
Chloroform	ND		1.0	ug/L	1	18-Dec-2018 02:21
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:21
Ethylbenzene	ND		1.0	ug/L	1	18-Dec-2018 02:21
Methylene chloride	ND		2.0	ug/L	1	18-Dec-2018 02:21
Tetrachloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:21
Toluene	ND		1.0	ug/L	1	18-Dec-2018 02:21
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:21
Trichloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:21
Vinyl chloride	ND		1.0	ug/L	1	18-Dec-2018 02:21
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	18-Dec-2018 02:21
Xylenes, Total	ND		1.0	ug/L	1	18-Dec-2018 02:21
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>90.4</i>		<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 02:21</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>96.6</i>		<i>81-113</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 02:21</i>
<i>Surr: Dibromofluoromethane</i>	<i>99.9</i>		<i>77-123</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 02:21</i>
<i>Surr: Toluene-d8</i>	<i>101</i>		<i>82-127</i>	<i>%REC</i>	<i>1</i>	<i>18-Dec-2018 02:21</i>
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>				Analyst: PVL
Ethane	ND		100	ug/L	100	18-Dec-2018 15:59
Ethene	ND		100	ug/L	100	18-Dec-2018 15:59
<b>Methane</b>	<b>1,560</b>		<b>50.0</b>	<b>ug/L</b>	100	18-Dec-2018 15:59
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>			Prep:SW3010A / 13-Dec-2018	Analyst: RPM
<b>Manganese</b>	<b>0.688</b>		<b>0.0500</b>	<b>mg/L</b>	10	18-Dec-2018 13:33
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>				Analyst: KMU
<b>Nitrogen, Nitrate (As N)</b>	<b>0.111</b>	H	<b>0.100</b>	<b>mg/L</b>	1	06-Dec-2018 20:53
Nitrogen, Nitrite (As N)	ND	H	0.100	mg/L	1	06-Dec-2018 20:53
<b>Sulfate</b>	<b>74.3</b>		<b>0.500</b>	<b>mg/L</b>	1	06-Dec-2018 20:53
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>				Analyst: KVL
<b>Sulfide</b>	<b>2.84</b>		<b>1.00</b>	<b>mg/L</b>	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>				Analyst: AJH
<b>Organic Carbon, Total</b>	<b>3.94</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 18:02

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW7S / GW01  
 Collection Date: 04-Dec-2018 15:50

**ANALYTICAL REPORT**  
 WorkOrder:HS18120251  
 Lab ID:HS18120251-06  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>				Analyst: AKP
1,1,1-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 02:45
1,1,2-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 02:45
1,1-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 02:45
1,1-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:45
1,2-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 02:45
Acetone	ND		2.0	ug/L	1	18-Dec-2018 02:45
Benzene	ND		1.0	ug/L	1	18-Dec-2018 02:45
Carbon disulfide	ND		2.0	ug/L	1	18-Dec-2018 02:45
Chloroform	ND		1.0	ug/L	1	18-Dec-2018 02:45
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:45
Ethylbenzene	ND		1.0	ug/L	1	18-Dec-2018 02:45
Methylene chloride	ND		2.0	ug/L	1	18-Dec-2018 02:45
Tetrachloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:45
Toluene	ND		1.0	ug/L	1	18-Dec-2018 02:45
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:45
Trichloroethene	ND		1.0	ug/L	1	18-Dec-2018 02:45
Vinyl chloride	ND		1.0	ug/L	1	18-Dec-2018 02:45
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	18-Dec-2018 02:45
Xylenes, Total	ND		1.0	ug/L	1	18-Dec-2018 02:45
<i>Surr: 1,2-Dichloroethane-d4</i>	89.5		70-126	%REC	1	18-Dec-2018 02:45
<i>Surr: 4-Bromofluorobenzene</i>	95.9		81-113	%REC	1	18-Dec-2018 02:45
<i>Surr: Dibromofluoromethane</i>	99.8		77-123	%REC	1	18-Dec-2018 02:45
<i>Surr: Toluene-d8</i>	101		82-127	%REC	1	18-Dec-2018 02:45
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>				Analyst: PVL
Ethane	ND		1.00	ug/L	1	18-Dec-2018 16:10
<b>Ethene</b>	<b>1.66</b>		<b>1.00</b>	<b>ug/L</b>	1	18-Dec-2018 16:10
<b>Methane</b>	<b>5.22</b>		<b>0.500</b>	<b>ug/L</b>	1	18-Dec-2018 16:10
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>			Prep:SW3010A / 13-Dec-2018	Analyst: RPM
<b>Manganese</b>	<b>3.18</b>		<b>0.250</b>	<b>mg/L</b>	50	18-Dec-2018 13:35
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>				Analyst: KMU
<b>Nitrogen, Nitrate (As N)</b>	<b>0.266</b>		<b>0.100</b>	<b>mg/L</b>	1	06-Dec-2018 14:51
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	06-Dec-2018 14:51
<b>Sulfate</b>	<b>69.1</b>		<b>0.500</b>	<b>mg/L</b>	1	06-Dec-2018 14:51
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>				Analyst: KVL
<b>Sulfide</b>	<b>1.44</b>		<b>1.00</b>	<b>mg/L</b>	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>				Analyst: AJH
<b>Organic Carbon, Total</b>	<b>2.29</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 18:18

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW7D / GW01  
 Collection Date: 04-Dec-2018 16:45

**ANALYTICAL REPORT**  
 WorkOrder:HS18120251  
 Lab ID:HS18120251-07  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: AKP		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 03:09
1,1,2-Trichloroethane	ND		1.0	ug/L	1	18-Dec-2018 03:09
1,1-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 03:09
1,1-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 03:09
1,2-Dichloroethane	ND		1.0	ug/L	1	18-Dec-2018 03:09
Acetone	ND		2.0	ug/L	1	18-Dec-2018 03:09
Benzene	ND		1.0	ug/L	1	18-Dec-2018 03:09
Carbon disulfide	ND		2.0	ug/L	1	18-Dec-2018 03:09
Chloroform	ND		1.0	ug/L	1	18-Dec-2018 03:09
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 03:09
Ethylbenzene	ND		1.0	ug/L	1	18-Dec-2018 03:09
Methylene chloride	ND		2.0	ug/L	1	18-Dec-2018 03:09
Tetrachloroethene	ND		1.0	ug/L	1	18-Dec-2018 03:09
Toluene	ND		1.0	ug/L	1	18-Dec-2018 03:09
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	18-Dec-2018 03:09
Trichloroethene	ND		1.0	ug/L	1	18-Dec-2018 03:09
Vinyl chloride	ND		1.0	ug/L	1	18-Dec-2018 03:09
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	18-Dec-2018 03:09
Xylenes, Total	ND		1.0	ug/L	1	18-Dec-2018 03:09
<i>Surr: 1,2-Dichloroethane-d4</i>	92.0		70-126	%REC	1	18-Dec-2018 03:09
<i>Surr: 4-Bromofluorobenzene</i>	95.7		81-113	%REC	1	18-Dec-2018 03:09
<i>Surr: Dibromofluoromethane</i>	102		77-123	%REC	1	18-Dec-2018 03:09
<i>Surr: Toluene-d8</i>	99.9		82-127	%REC	1	18-Dec-2018 03:09
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>		Analyst: PVL		
<b>Ethane</b>	<b>371</b>		<b>200</b>	<b>ug/L</b>	200	18-Dec-2018 16:50
Ethene	ND		200	ug/L	200	18-Dec-2018 16:50
<b>Methane</b>	<b>996</b>		<b>100</b>	<b>ug/L</b>	200	18-Dec-2018 16:50
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>		Prep:SW3010A / 13-Dec-2018		Analyst: RPM
<b>Manganese</b>	<b>0.492</b>		<b>0.0500</b>	<b>mg/L</b>	10	18-Dec-2018 13:41
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>		Analyst: KMU		
Nitrogen, Nitrate (As N)	ND		0.100	mg/L	1	06-Dec-2018 16:18
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	06-Dec-2018 16:18
<b>Sulfate</b>	<b>40.9</b>		<b>0.500</b>	<b>mg/L</b>	1	06-Dec-2018 16:18
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>		Analyst: KVL		
Sulfide	ND		1.00	mg/L	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>		Analyst: AJH		
<b>Organic Carbon, Total</b>	<b>4.44</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 18:35

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: Trip Blank  
 Collection Date: 04-Dec-2018 00:00

**ANALYTICAL REPORT**

WorkOrder:HS18120251  
 Lab ID:HS18120251-08  
 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: AKP		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	17-Dec-2018 23:56
1,1,2-Trichloroethane	ND		1.0	ug/L	1	17-Dec-2018 23:56
1,1-Dichloroethane	ND		1.0	ug/L	1	17-Dec-2018 23:56
1,1-Dichloroethene	ND		1.0	ug/L	1	17-Dec-2018 23:56
1,2-Dichloroethane	ND		1.0	ug/L	1	17-Dec-2018 23:56
Acetone	ND		2.0	ug/L	1	17-Dec-2018 23:56
Benzene	ND		1.0	ug/L	1	17-Dec-2018 23:56
Carbon disulfide	ND		2.0	ug/L	1	17-Dec-2018 23:56
Chloroform	ND		1.0	ug/L	1	17-Dec-2018 23:56
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	17-Dec-2018 23:56
Ethylbenzene	ND		1.0	ug/L	1	17-Dec-2018 23:56
Methylene chloride	ND		2.0	ug/L	1	17-Dec-2018 23:56
Tetrachloroethene	ND		1.0	ug/L	1	17-Dec-2018 23:56
Toluene	ND		1.0	ug/L	1	17-Dec-2018 23:56
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	17-Dec-2018 23:56
Trichloroethene	ND		1.0	ug/L	1	17-Dec-2018 23:56
Vinyl chloride	ND		1.0	ug/L	1	17-Dec-2018 23:56
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	17-Dec-2018 23:56
Xylenes, Total	ND		1.0	ug/L	1	17-Dec-2018 23:56
Surr: 1,2-Dichloroethane-d4	90.2		70-126	%REC	1	17-Dec-2018 23:56
Surr: 4-Bromofluorobenzene	93.6		81-113	%REC	1	17-Dec-2018 23:56
Surr: Dibromofluoromethane	100		77-123	%REC	1	17-Dec-2018 23:56
Surr: Toluene-d8	102		82-127	%REC	1	17-Dec-2018 23:56

**WEIGHT LOG**

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**Batch ID:** 135559      **Method:** ICP-MS METALS BY SW6020A      **Prep:** 3010A

<b>SampleID</b>	<b>Container</b>	<b>Sample Wt/Vol</b>	<b>Final Volume</b>	<b>Prep Factor</b>
HS18120251-01	1	10	10 (mL)	1
HS18120251-02	1	10	10 (mL)	1
HS18120251-03	1	10	10 (mL)	1
HS18120251-04	1	10	10 (mL)	1
HS18120251-05	1	10	10 (mL)	1
HS18120251-06	1	10	10 (mL)	1
HS18120251-07	1	10	10 (mL)	1

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID</b> 135559	<b>Test Name :</b> ICP-MS METALS BY SW6020A			<b>Matrix:</b> Groundwater		
HS18120251-01	33MW5I / GW01	04 Dec 2018 10:15		13 Dec 2018 09:30	18 Dec 2018 13:25	100
HS18120251-02	33MW5-1000 / GW01 "Dup"	04 Dec 2018 00:00		13 Dec 2018 09:30	18 Dec 2018 13:27	100
HS18120251-03	33MW5S / GW01	04 Dec 2018 12:00		13 Dec 2018 09:30	18 Dec 2018 13:29	100
HS18120251-04	33MW05I / RW01	04 Dec 2018 10:35		13 Dec 2018 09:30	18 Dec 2018 13:31	1
HS18120251-05	33MW5D / GW01	04 Dec 2018 14:35		13 Dec 2018 09:30	18 Dec 2018 13:33	10
HS18120251-06	33MW7S / GW01	04 Dec 2018 15:50		13 Dec 2018 09:30	18 Dec 2018 13:35	50
HS18120251-07	33MW7D / GW01	04 Dec 2018 16:45		13 Dec 2018 09:30	18 Dec 2018 13:41	10
<b>Batch ID</b> R328810	<b>Test Name :</b> ANIONS BY E300.0			<b>Matrix:</b> Groundwater		
HS18120251-02	33MW5-1000 / GW01 "Dup"	04 Dec 2018 00:00			06 Dec 2018 20:39	1
HS18120251-05	33MW5D / GW01	04 Dec 2018 14:35			06 Dec 2018 20:53	1
<b>Batch ID</b> R329295	<b>Test Name :</b> SULFIDE BY SM4500 S2-F			<b>Matrix:</b> Groundwater		
HS18120251-01	33MW5I / GW01	04 Dec 2018 10:15			11 Dec 2018 17:00	1
HS18120251-02	33MW5-1000 / GW01 "Dup"	04 Dec 2018 00:00			11 Dec 2018 17:00	1
HS18120251-03	33MW5S / GW01	04 Dec 2018 12:00			11 Dec 2018 17:00	1
HS18120251-04	33MW05I / RW01	04 Dec 2018 10:35			11 Dec 2018 17:00	1
HS18120251-05	33MW5D / GW01	04 Dec 2018 14:35			11 Dec 2018 17:00	1
HS18120251-06	33MW7S / GW01	04 Dec 2018 15:50			11 Dec 2018 17:00	1
HS18120251-07	33MW7D / GW01	04 Dec 2018 16:45			11 Dec 2018 17:00	1
<b>Batch ID</b> R329319	<b>Test Name :</b> ANIONS BY E300.0			<b>Matrix:</b> Groundwater		
HS18120251-01	33MW5I / GW01	04 Dec 2018 10:15			06 Dec 2018 10:17	1
HS18120251-04	33MW05I / RW01	04 Dec 2018 10:35			06 Dec 2018 10:32	1
<b>Batch ID</b> R329320	<b>Test Name :</b> ANIONS BY E300.0			<b>Matrix:</b> Groundwater		
HS18120251-03	33MW5S / GW01	04 Dec 2018 12:00			06 Dec 2018 13:53	1
HS18120251-06	33MW7S / GW01	04 Dec 2018 15:50			06 Dec 2018 14:51	1
HS18120251-07	33MW7D / GW01	04 Dec 2018 16:45			06 Dec 2018 16:18	1
<b>Batch ID</b> R329406	<b>Test Name :</b> TOTAL ORGANIC CARBON BY SW9060A			<b>Matrix:</b> Groundwater		
HS18120251-01	33MW5I / GW01	04 Dec 2018 10:15			17 Dec 2018 16:55	1
HS18120251-02	33MW5-1000 / GW01 "Dup"	04 Dec 2018 00:00			17 Dec 2018 17:11	1
HS18120251-03	33MW5S / GW01	04 Dec 2018 12:00			17 Dec 2018 17:28	1
HS18120251-04	33MW05I / RW01	04 Dec 2018 10:35			17 Dec 2018 17:45	1
HS18120251-05	33MW5D / GW01	04 Dec 2018 14:35			17 Dec 2018 18:02	1
HS18120251-06	33MW7S / GW01	04 Dec 2018 15:50			17 Dec 2018 18:18	1
HS18120251-07	33MW7D / GW01	04 Dec 2018 16:45			17 Dec 2018 18:35	1
<b>Batch ID</b> R329441	<b>Test Name :</b> LOW LEVEL VOLATILES BY SW8260C			<b>Matrix:</b> Water		
HS18120251-08	Trip Blank	04 Dec 2018 00:00			17 Dec 2018 23:56	1

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID</b> R329441	<b>Test Name :</b> LOW LEVEL VOLATILES BY SW8260C			<b>Matrix:</b> Groundwater		
HS18120251-01	33MW5I / GW01	04 Dec 2018 10:15			18 Dec 2018 04:24	5
HS18120251-01	33MW5I / GW01	04 Dec 2018 10:15			18 Dec 2018 03:57	1
HS18120251-02	33MW5-1000 / GW01 "Dup"	04 Dec 2018 00:00			18 Dec 2018 05:14	5
HS18120251-02	33MW5-1000 / GW01 "Dup"	04 Dec 2018 00:00			18 Dec 2018 04:48	1
HS18120251-03	33MW5S / GW01	04 Dec 2018 12:00			18 Dec 2018 00:20	1
HS18120251-04	33MW05I / RW01	04 Dec 2018 10:35			18 Dec 2018 01:57	1
HS18120251-05	33MW5D / GW01	04 Dec 2018 14:35			18 Dec 2018 02:21	1
HS18120251-06	33MW7S / GW01	04 Dec 2018 15:50			18 Dec 2018 02:45	1
HS18120251-07	33MW7D / GW01	04 Dec 2018 16:45			18 Dec 2018 03:09	1
<b>Batch ID</b> R329493	<b>Test Name :</b> DISSOLVED GASES BY RSK-175			<b>Matrix:</b> Groundwater		
HS18120251-01	33MW5I / GW01	04 Dec 2018 10:15			18 Dec 2018 14:41	100
HS18120251-01	33MW5I / GW01	04 Dec 2018 10:15			18 Dec 2018 14:25	1
HS18120251-02	33MW5-1000 / GW01 "Dup"	04 Dec 2018 00:00			18 Dec 2018 15:15	100
HS18120251-02	33MW5-1000 / GW01 "Dup"	04 Dec 2018 00:00			18 Dec 2018 15:03	1
HS18120251-03	33MW5S / GW01	04 Dec 2018 12:00			18 Dec 2018 15:26	1
HS18120251-04	33MW05I / RW01	04 Dec 2018 10:35			18 Dec 2018 15:37	1
HS18120251-05	33MW5D / GW01	04 Dec 2018 14:35			18 Dec 2018 15:59	100
HS18120251-06	33MW7S / GW01	04 Dec 2018 15:50			18 Dec 2018 16:10	1
HS18120251-07	33MW7D / GW01	04 Dec 2018 16:45			18 Dec 2018 16:50	200
<b>Batch ID</b> R329653	<b>Test Name :</b> ANIONS BY E300.0			<b>Matrix:</b> Groundwater		
HS18120251-01	33MW5I / GW01	04 Dec 2018 10:15			20 Dec 2018 00:35	10
HS18120251-02	33MW5-1000 / GW01 "Dup"	04 Dec 2018 00:00			20 Dec 2018 00:49	10

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

**Batch ID:** R329493      **Instrument:** FID-4      **Method:** RSK-175

<b>MBLK</b>		Sample ID: <b>MBLK-181218</b>		Units: <b>ug/L</b>		Analysis Date: <b>18-Dec-2018 10:53</b>				
Client ID:		Run ID: <b>FID-4_329493</b>		SeqNo: <b>4871182</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ethane	ND	1.00								
Ethene	ND	1.00								
Methane	ND	0.500								

<b>LCS</b>		Sample ID: <b>LCS-181218</b>		Units: <b>ug/L</b>		Analysis Date: <b>18-Dec-2018 10:20</b>				
Client ID:		Run ID: <b>FID-4_329493</b>		SeqNo: <b>4871180</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ethane	19.52	1.00	18.04	0	108	75 - 125				
Ethene	17.5	1.00	16.8	0	104	75 - 125				
Methane	10.1	0.500	9.647	0	105	75 - 125				

<b>LCS D</b>		Sample ID: <b>LCS D-181218</b>		Units: <b>ug/L</b>		Analysis Date: <b>18-Dec-2018 10:31</b>				
Client ID:		Run ID: <b>FID-4_329493</b>		SeqNo: <b>4871181</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ethane	18.56	1.00	18.04	0	103	75 - 125	19.52	5.03	30	
Ethene	18.24	1.00	16.8	0	109	75 - 125	17.5	4.18	30	
Methane	10.07	0.500	9.647	0	104	75 - 125	10.1	0.336	30	

<b>DUP</b>		Sample ID: <b>HS18120471-08DUP</b>		Units: <b>ug/L</b>		Analysis Date: <b>18-Dec-2018 11:16</b>				
Client ID:		Run ID: <b>FID-4_329493</b>		SeqNo: <b>4871184</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ethane	ND	1.00					0.4031		0	30
Ethene	ND	1.00					1.784		0	30
Methane	9.7	0.500					8.692		11	30

The following samples were analyzed in this batch:

HS18120251-01	HS18120251-02	HS18120251-03	HS18120251-04
HS18120251-05	HS18120251-06	HS18120251-07	

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

<b>Batch ID:</b> 135559	<b>Instrument:</b> ICPMS05	<b>Method:</b> SW6020
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<b>MBLK</b>	Sample ID: <b>MBLK-135559</b>	Units: <b>mg/L</b>	Analysis Date: <b>18-Dec-2018 13:01</b>							
Client ID:	Run ID: <b>ICPMS05_329470</b>	SeqNo: <b>4870817</b>	PrepDate: <b>13-Dec-2018</b> DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Manganese ND 0.00500

<b>LCS</b>	Sample ID: <b>LCS-135559</b>	Units: <b>mg/L</b>	Analysis Date: <b>18-Dec-2018 13:03</b>							
Client ID:	Run ID: <b>ICPMS05_329470</b>	SeqNo: <b>4870818</b>	PrepDate: <b>13-Dec-2018</b> DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Manganese 0.054 0.00500 0.05 0 108 80 - 120

<b>MS</b>	Sample ID: <b>HS18120558-01MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>18-Dec-2018 12:06</b>							
Client ID:	Run ID: <b>ICPMS05_329470</b>	SeqNo: <b>4870789</b>	PrepDate: <b>13-Dec-2018</b> DF: <b>5</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Manganese 0.06803 0.0250 0.05 0.01766 101 80 - 120

<b>MSD</b>	Sample ID: <b>HS18120558-01MSD</b>	Units: <b>mg/L</b>	Analysis Date: <b>18-Dec-2018 12:08</b>							
Client ID:	Run ID: <b>ICPMS05_329470</b>	SeqNo: <b>4870790</b>	PrepDate: <b>13-Dec-2018</b> DF: <b>5</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Manganese 0.07345 0.0250 0.05 0.01766 112 80 - 120 0.06803 7.67 20

<b>PDS</b>	Sample ID: <b>HS18120558-01PDS</b>	Units: <b>mg/L</b>	Analysis Date: <b>18-Dec-2018 12:10</b>							
Client ID:	Run ID: <b>ICPMS05_329470</b>	SeqNo: <b>4870791</b>	PrepDate: <b>13-Dec-2018</b> DF: <b>5</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Manganese 0.5292 0.0250 0.5 0.01766 102 75 - 125

<b>SD</b>	Sample ID: <b>HS18120558-01SD</b>	Units: <b>mg/L</b>	Analysis Date: <b>18-Dec-2018 11:58</b>							
Client ID:	Run ID: <b>ICPMS05_329470</b>	SeqNo: <b>4870785</b>	PrepDate: <b>13-Dec-2018</b> DF: <b>25</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	RPD Limit	Qual

Manganese ND 0.125 -0.01626 0 10

<b>The following samples were analyzed in this batch:</b>	HS18120251-01	HS18120251-02	HS18120251-03	HS18120251-04
	HS18120251-05	HS18120251-06	HS18120251-07	

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

**Batch ID:** R329441      **Instrument:** VOA2      **Method:** SW8260

**MBLK**      Sample ID: **VBLKW-181217**      Units: **ug/L**      Analysis Date: **17-Dec-2018 23:08**  
 Client ID:      Run ID: **VOA2\_329441**      SeqNo: **4869949**      PrepDate:      DF: **1**  
 Analyte      Result      PQL      SPK Val      SPK Ref Value      %REC      Control Limit      RPD Ref Value      %RPD      RPD Limit Qual

1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloroethane	ND	1.0								
Acetone	ND	2.0								
Benzene	ND	1.0								
Carbon disulfide	ND	2.0								
Chloroform	ND	1.0								
cis-1,2-Dichloroethene	ND	1.0								
Ethylbenzene	ND	1.0								
Methylene chloride	ND	2.0								
Tetrachloroethene	ND	1.0								
Toluene	ND	1.0								
trans-1,2-Dichloroethene	ND	1.0								
Trichloroethene	ND	1.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.0								
1,2-Dichloroethene, Total	ND	1.0								
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>46.13</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>92.3</i>	<i>70 - 123</i>				
<i>Surr: 4-Bromofluorobenzene</i>	<i>49.4</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>98.8</i>	<i>82 - 115</i>				
<i>Surr: Dibromofluoromethane</i>	<i>49.76</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>99.5</i>	<i>73 - 126</i>				
<i>Surr: Toluene-d8</i>	<i>52.52</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>105</i>	<i>81 - 120</i>				

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

Batch ID: R329441		Instrument: VOA2		Method: SW8260						
<b>LCS</b>	Sample ID: <b>VLCSW-181217</b>	Units: <b>ug/L</b>			Analysis Date: <b>17-Dec-2018 22:20</b>					
Client ID:	Run ID: <b>VOA2_329441</b>	SeqNo: <b>4869948</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	20.35	1.0	20	0	102	70 - 130				
1,1,2-Trichloroethane	20.04	1.0	20	0	100	77 - 113				
1,1-Dichloroethane	20.11	1.0	20	0	101	71 - 122				
1,1-Dichloroethene	21.83	1.0	20	0	109	70 - 130				
1,2-Dichloroethane	17.73	1.0	20	0	88.7	70 - 124				
Acetone	41.02	2.0	40	0	103	70 - 130				
Benzene	20.69	1.0	20	0	103	74 - 120				
Carbon disulfide	41.51	2.0	40	0	104	70 - 130				
Chloroform	19.34	1.0	20	0	96.7	71 - 121				
cis-1,2-Dichloroethene	20.13	1.0	20	0	101	75 - 122				
Ethylbenzene	19.93	1.0	20	0	99.7	77 - 117				
Methylene chloride	21.98	2.0	20	0	110	70 - 127				
Tetrachloroethene	19.96	1.0	20	0	99.8	76 - 119				
Toluene	20.11	1.0	20	0	101	77 - 118				
trans-1,2-Dichloroethene	20.22	1.0	20	0	101	72 - 127				
Trichloroethene	20.01	1.0	20	0	100	77 - 121				
Vinyl chloride	22.07	1.0	20	0	110	70 - 130				
Xylenes, Total	59.97	1.0	60	0	99.9	75 - 122				
1,2-Dichloroethene, Total	40.35	1.0	40	0	101	72 - 127				
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>45.7</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>91.4</i>	<i>70 - 130</i>				
<i>Surr: 4-Bromofluorobenzene</i>	<i>48.83</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.7</i>	<i>82 - 115</i>				
<i>Surr: Dibromofluoromethane</i>	<i>48.78</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.6</i>	<i>73 - 126</i>				
<i>Surr: Toluene-d8</i>	<i>49.23</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>98.5</i>	<i>81 - 120</i>				

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

Batch ID: R329441		Instrument: VOA2		Method: SW8260						
MS		Sample ID: HS18120251-03MS		Units: ug/L		Analysis Date: 18-Dec-2018 00:44				
Client ID: 33MW5S / GW01		Run ID: VOA2_329441		SeqNo: 4869953		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual	
1,1,1-Trichloroethane	21.21	1.0	20	0	106	70 - 130				
1,1,2-Trichloroethane	20.18	1.0	20	0	101	70 - 117				
1,1-Dichloroethane	22.72	1.0	20	0	114	70 - 127				
1,1-Dichloroethene	24.33	1.0	20	0	122	70 - 130				
1,2-Dichloroethane	17.98	1.0	20	0	89.9	70 - 127				
Acetone	46.25	2.0	40	0	116	70 - 130				
Benzene	21.49	1.0	20	0	107	70 - 127				
Carbon disulfide	46.95	2.0	40	0	117	70 - 130				
Chloroform	20.12	1.0	20	0	101	70 - 125				
cis-1,2-Dichloroethene	27.33	1.0	20	6.364	105	70 - 128				
Ethylbenzene	20.88	1.0	20	0	104	70 - 124				
Methylene chloride	22.96	2.0	20	0	115	70 - 128				
Tetrachloroethene	21.46	1.0	20	0	107	70 - 130				
Toluene	20.87	1.0	20	0	104	70 - 123				
trans-1,2-Dichloroethene	23.29	1.0	20	0	116	70 - 130				
Trichloroethene	21.06	1.0	20	0	105	70 - 129				
Vinyl chloride	24.12	1.0	20	0	121	70 - 130				
Xylenes, Total	62.04	1.0	60	0	103	70 - 130				
1,2-Dichloroethene, Total	50.62	1.0	40	6.364	111	70 - 130				
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>46.79</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>93.6</i>	<i>70 - 126</i>				
<i>Surr: 4-Bromofluorobenzene</i>	<i>49.08</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>98.2</i>	<i>81 - 113</i>				
<i>Surr: Dibromofluoromethane</i>	<i>48.89</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.8</i>	<i>77 - 123</i>				
<i>Surr: Toluene-d8</i>	<i>48.92</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.8</i>	<i>82 - 127</i>				

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

**Batch ID:** R329441      **Instrument:** VOA2      **Method:** SW8260

MSD		Sample ID: HS18120251-03MSD			Units: ug/L		Analysis Date: 18-Dec-2018 01:08			
Client ID: 33MW5S / GW01		Run ID: VOA2_329441			SeqNo: 4869954		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	21.06	1.0	20	0	105	70 - 130	21.21	0.698	20	
1,1,2-Trichloroethane	19.47	1.0	20	0	97.4	70 - 117	20.18	3.58	20	
1,1-Dichloroethane	20.93	1.0	20	0	105	70 - 127	22.72	8.22	20	
1,1-Dichloroethene	22.93	1.0	20	0	115	70 - 130	24.33	5.92	20	
1,2-Dichloroethane	17.1	1.0	20	0	85.5	70 - 127	17.98	5.02	20	
Acetone	41.78	2.0	40	0	104	70 - 130	46.25	10.1	20	
Benzene	20.69	1.0	20	0	103	70 - 127	21.49	3.77	20	
Carbon disulfide	43.6	2.0	40	0	109	70 - 130	46.95	7.4	20	
Chloroform	19.91	1.0	20	0	99.5	70 - 125	20.12	1.06	20	
cis-1,2-Dichloroethene	26.94	1.0	20	6.364	103	70 - 128	27.33	1.44	20	
Ethylbenzene	20.49	1.0	20	0	102	70 - 124	20.88	1.89	20	
Methylene chloride	21.62	2.0	20	0	108	70 - 128	22.96	6.02	20	
Tetrachloroethene	20.54	1.0	20	0	103	70 - 130	21.46	4.37	20	
Toluene	20.68	1.0	20	0	103	70 - 123	20.87	0.954	20	
trans-1,2-Dichloroethene	21.77	1.0	20	0	109	70 - 130	23.29	6.77	20	
Trichloroethene	20.71	1.0	20	0	104	70 - 129	21.06	1.7	20	
Vinyl chloride	23.25	1.0	20	0	116	70 - 130	24.12	3.67	20	
Xylenes, Total	61.91	1.0	60	0	103	70 - 130	62.04	0.2	20	
1,2-Dichloroethene, Total	48.7	1.0	40	6.364	106	70 - 130	50.62	3.86	20	
Surr: 1,2-Dichloroethane-d4	46.24	1.0	50	0	92.5	70 - 126	46.79	1.18	20	
Surr: 4-Bromofluorobenzene	49.98	1.0	50	0	100.0	81 - 113	49.08	1.81	20	
Surr: Dibromofluoromethane	49.77	1.0	50	0	99.5	77 - 123	48.89	1.79	20	
Surr: Toluene-d8	49.32	1.0	50	0	98.6	82 - 127	48.92	0.812	20	

The following samples were analyzed in this batch:

HS18120251-01	HS18120251-02	HS18120251-03	HS18120251-04
HS18120251-05	HS18120251-06	HS18120251-07	HS18120251-08

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

<b>Batch ID:</b> R328810	<b>Instrument:</b> ICS2100	<b>Method:</b> E300
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<b>MBLK</b>	Sample ID: <b>WBLKW1-120618</b>	Units: <b>mg/L</b>	Analysis Date: <b>06-Dec-2018 18:57</b>							
Client ID:	Run ID: <b>ICS2100_328810</b>	SeqNo: <b>4854039</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	ND	0.100								
Nitrogen, Nitrite (As N)	ND	0.100								
Sulfate	ND	0.500								

<b>LCS</b>	Sample ID: <b>WLCSW1-120618</b>	Units: <b>mg/L</b>	Analysis Date: <b>06-Dec-2018 19:12</b>							
Client ID:	Run ID: <b>ICS2100_328810</b>	SeqNo: <b>4854040</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	4.015	0.100	4	0	100	90 - 110				
Nitrogen, Nitrite (As N)	4.353	0.100	4	0	109	90 - 110				
Sulfate	19.78	0.500	20	0	98.9	90 - 110				

<b>LCS D</b>	Sample ID: <b>WLCSDW1-120618</b>	Units: <b>mg/L</b>	Analysis Date: <b>06-Dec-2018 19:26</b>							
Client ID:	Run ID: <b>ICS2100_328810</b>	SeqNo: <b>4854041</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	3.867	0.100	4	0	96.7	90 - 110	4.015	3.76	20	
Nitrogen, Nitrite (As N)	4.215	0.100	4	0	105	90 - 110	4.353	3.22	20	
Sulfate	19.12	0.500	20	0	95.6	90 - 110	19.78	3.4	20	

<b>MS</b>	Sample ID: <b>HS18120280-01MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>07-Dec-2018 01:01</b>							
Client ID:	Run ID: <b>ICS2100_328810</b>	SeqNo: <b>4854059</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	2.87	0.100	2	0.756	106	80 - 120				
Nitrogen, Nitrite (As N)	2.114	0.100	2	0	106	80 - 120				
Sulfate	2379	0.500	10	2402	-230	80 - 120				SEO

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

**Batch ID:** R328810      **Instrument:** ICS2100      **Method:** E300

<b>MS</b>		Sample ID: <b>HS18120266-01MS</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 22:50</b>			
Client ID:		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854050</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	1.897	0.100	2	0	94.8	80 - 120			
Nitrogen, Nitrite (As N)	2.061	0.100	2	0	103	80 - 120			
Sulfate	46.8	0.500	10	38.01	87.9	80 - 120			

<b>MSD</b>		Sample ID: <b>HS18120280-01MSD</b>		Units: <b>mg/L</b>		Analysis Date: <b>07-Dec-2018 01:15</b>			
Client ID:		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854060</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	2.921	0.100	2	0.756	108	80 - 120	2.87	1.76	20
Nitrogen, Nitrite (As N)	2.156	0.100	2	0	108	80 - 120	2.114	1.97	20
Sulfate	2428	0.500	10	2402	262	80 - 120	2379	2.05	20 SEO

<b>MSD</b>		Sample ID: <b>HS18120266-01MSD</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 23:04</b>			
Client ID:		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854051</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	1.888	0.100	2	0	94.4	80 - 120	1.897	0.476	20
Nitrogen, Nitrite (As N)	2.057	0.100	2	0	103	80 - 120	2.061	0.194	20
Sulfate	46.51	0.500	10	38.01	85.0	80 - 120	46.8	0.617	20

The following samples were analyzed in this batch: HS18120251-02      HS18120251-05

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

<b>Batch ID:</b> R329295	<b>Instrument:</b> WetChem_HS	<b>Method:</b> SM4500 S2-F
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<b>MBLK</b>	Sample ID: <b>MBLK-R329295</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866075</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide ND 1.00

<b>LCS</b>	Sample ID: <b>LCS-R329295</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866074</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide 21.84 1.00 25 0 87.4 85 - 115

<b>LCSD</b>	Sample ID: <b>LCSD-R329295</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866073</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide 21.64 1.00 25 0 86.6 85 - 115 21.84 0.92 20

<b>MS</b>	Sample ID: <b>HS18120251-07MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID: <b>33MW7D / GW01</b>	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866076</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide 23.84 1.00 25 0.24 94.4 80 - 120

The following samples were analyzed in this batch: HS18120251-01 HS18120251-02 HS18120251-03 HS18120251-04  
 HS18120251-05 HS18120251-06 HS18120251-07

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

<b>Batch ID:</b> R329319	<b>Instrument:</b> ICS2100	<b>Method:</b> E300
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<b>MBLK</b>	Sample ID: <b>WBLKW2-120518</b>	Units: <b>mg/L</b>	Analysis Date: <b>06-Dec-2018 06:36</b>							
Client ID:	Run ID: <b>ICS2100_329319</b>	SeqNo: <b>4866767</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	ND	0.100								
Nitrogen, Nitrite (As N)	ND	0.100								
Sulfate	ND	0.500								

<b>LCS</b>	Sample ID: <b>WLCSW2-120518</b>	Units: <b>mg/L</b>	Analysis Date: <b>06-Dec-2018 06:50</b>							
Client ID:	Run ID: <b>ICS2100_329319</b>	SeqNo: <b>4866768</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	3.854	0.100	4	0	96.4	90 - 110				
Nitrogen, Nitrite (As N)	4.252	0.100	4	0	106	90 - 110				
Sulfate	19.58	0.500	20	0	97.9	90 - 110				

<b>LCS D</b>	Sample ID: <b>WLCSDW2-120518</b>	Units: <b>mg/L</b>	Analysis Date: <b>06-Dec-2018 07:05</b>							
Client ID:	Run ID: <b>ICS2100_329319</b>	SeqNo: <b>4866769</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	4.042	0.100	4	0	101	90 - 110	3.854	4.76	20	
Nitrogen, Nitrite (As N)	4.446	0.100	4	0	111	90 - 110	4.252	4.46	20	S
Sulfate	20.57	0.500	20	0	103	90 - 110	19.58	4.89	20	

<b>MS</b>	Sample ID: <b>HS18120166-42MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>06-Dec-2018 05:38</b>							
Client ID:	Run ID: <b>ICS2100_329319</b>	SeqNo: <b>4866763</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	7.567	0.100	2	5.628	97.0	80 - 120				
Nitrogen, Nitrite (As N)	2.077	0.100	2	0	104	80 - 120				
Sulfate	185.3	0.500	10	177.6	76.7	80 - 120				SEO

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

Batch ID: R329319		Instrument: ICS2100		Method: E300						
<b>MS</b>		Sample ID: <b>HS18120166-06MS</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 01:59</b>				
Client ID:		Run ID: <b>ICS2100_329319</b>		SeqNo: <b>4866751</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	1.889	0.100	2	0	94.4	80 - 120				
Nitrogen, Nitrite (As N)	2.043	0.100	2	0	102	80 - 120				
Sulfate	279.1	0.500	10	271.6	74.8	80 - 120				SEO
<b>MSD</b>		Sample ID: <b>HS18120166-42MSD</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 05:52</b>				
Client ID:		Run ID: <b>ICS2100_329319</b>		SeqNo: <b>4866764</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	7.655	0.100	2	5.628	101	80 - 120	7.567	1.16	20	
Nitrogen, Nitrite (As N)	2.186	0.100	2	0	109	80 - 120	2.077	5.11	20	
Sulfate	187.2	0.500	10	177.6	96.0	80 - 120	185.3	1.04	20	EO
<b>MSD</b>		Sample ID: <b>HS18120166-06MSD</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 02:14</b>				
Client ID:		Run ID: <b>ICS2100_329319</b>		SeqNo: <b>4866752</b>		PrepDate:		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	1.907	0.100	2	0	95.4	80 - 120	1.889	0.948	20	
Nitrogen, Nitrite (As N)	2.064	0.100	2	0	103	80 - 120	2.043	1.02	20	
Sulfate	280	0.500	10	271.6	83.7	80 - 120	279.1	0.316	20	EO

The following samples were analyzed in this batch: HS18120251-01      HS18120251-04

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

**Batch ID:** R329320      **Instrument:** ICS2100      **Method:** E300

<b>MBLK</b>		Sample ID: <b>WBLKW3-120518</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 15:34</b>			
Client ID:		Run ID: <b>ICS2100_329320</b>		SeqNo: <b>4866808</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	ND	0.100							
Nitrogen, Nitrite (As N)	ND	0.100							
Sulfate	ND	0.500							

<b>LCS</b>		Sample ID: <b>WLCSW3-120518</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 15:49</b>			
Client ID:		Run ID: <b>ICS2100_329320</b>		SeqNo: <b>4866809</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	4.071	0.100	4	0	102	90 - 110			
Nitrogen, Nitrite (As N)	4.414	0.100	4	0	110	90 - 110			S
Sulfate	20	0.500	20	0	100	90 - 110			

<b>LCS D</b>		Sample ID: <b>WLCSDW3-120518</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 16:04</b>			
Client ID:		Run ID: <b>ICS2100_329320</b>		SeqNo: <b>4866810</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	3.872	0.100	4	0	96.8	90 - 110	4.071	5.01	20
Nitrogen, Nitrite (As N)	4.201	0.100	4	0	105	90 - 110	4.414	4.94	20
Sulfate	18.94	0.500	20	0	94.7	90 - 110	20	5.45	20

<b>MS</b>		Sample ID: <b>HS18120166-04MS</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 08:32</b>			
Client ID:		Run ID: <b>ICS2100_329320</b>		SeqNo: <b>4866788</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	4.984	0.100	2	3.154	91.5	80 - 120			
Nitrogen, Nitrite (As N)	2.263	0.100	2	0.164	105	80 - 120			
Sulfate	307.9	0.500	10	312.4	-44.3	80 - 120			SEO

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

Batch ID: R329320		Instrument: ICS2100		Method: E300						
<b>MS</b>	Sample ID: <b>HS18120166-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 17:46</b>						
Client ID:	Run ID: <b>ICS2100_329320</b>	SeqNo: <b>4866816</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	7.467	0.100	2	5.3	108	80 - 120				
Nitrogen, Nitrite (As N)	2.173	0.100	2	0	109	80 - 120				
Sulfate	136.1	0.500	10	123.9	123	80 - 120				SEO

<b>MSD</b>	Sample ID: <b>HS18120166-04MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 08:47</b>						
Client ID:	Run ID: <b>ICS2100_329320</b>	SeqNo: <b>4866789</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	5.206	0.100	2	3.154	103	80 - 120	4.984	4.36	20	
Nitrogen, Nitrite (As N)	2.356	0.100	2	0.164	110	80 - 120	2.263	4.03	20	
Sulfate	322.5	0.500	10	312.4	101	80 - 120	307.9	4.62	20	EO

<b>MSD</b>	Sample ID: <b>HS18120166-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 18:00</b>						
Client ID:	Run ID: <b>ICS2100_329320</b>	SeqNo: <b>4866817</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	7.333	0.100	2	5.3	102	80 - 120	7.467	1.81	20	
Nitrogen, Nitrite (As N)	2.137	0.100	2	0	107	80 - 120	2.173	1.67	20	
Sulfate	133.4	0.500	10	123.9	95.5	80 - 120	136.1	2.03	20	EO

The following samples were analyzed in this batch: HS18120251-03      HS18120251-06      HS18120251-07

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

<b>Batch ID:</b> R329406	<b>Instrument:</b> TOC_02	<b>Method:</b> SW9060
--------------------------	---------------------------	-----------------------

<b>MBLK</b>	Sample ID: <b>WBLKW1-121718</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 13:49</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868986</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total ND 1.00

<b>LCS</b>	Sample ID: <b>WLCSW1-121718</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 14:04</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868987</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total 9.777 1.00 10 0 97.8 85 - 115

<b>LCSD</b>	Sample ID: <b>WLCSDW1-121718</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 14:20</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868988</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total 9.752 1.00 10 0 97.5 85 - 115 9.777 0.256 20

<b>MS</b>	Sample ID: <b>HS18120372-01MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 14:52</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868990</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total 11.72 1.00 10 2.435 92.8 80 - 120

<b>MS</b>	Sample ID: <b>HS18120251-07MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 18:52</b>							
Client ID: <b>33MW7D / GW01</b>	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4870394</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total 14.28 1.00 10 4.442 98.4 80 - 120

<b>The following samples were analyzed in this batch:</b>	HS18120251-01	HS18120251-02	HS18120251-03	HS18120251-04
	HS18120251-05	HS18120251-06	HS18120251-07	

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

Batch ID: R329653		Instrument: ICS2100			Method: E300				
<b>MBLK</b>	Sample ID: <b>WBLKW1-121918</b>	Units: <b>mg/L</b>			Analysis Date: <b>19-Dec-2018 19:44</b>				
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875214</b>		PrepDate:			DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Sulfate	ND	0.500							
<b>LCS</b>	Sample ID: <b>WLCSW1-121918</b>	Units: <b>mg/L</b>			Analysis Date: <b>19-Dec-2018 19:58</b>				
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875215</b>		PrepDate:			DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Sulfate	19.06	0.500	20	0	95.3	90 - 110			
<b>LCSD</b>	Sample ID: <b>WLCSDW1-121918</b>	Units: <b>mg/L</b>			Analysis Date: <b>19-Dec-2018 20:13</b>				
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875216</b>		PrepDate:			DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Sulfate	19.72	0.500	20	0	98.6	90 - 110	19.06	3.39	20
<b>MS</b>	Sample ID: <b>HS18121069-05MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>19-Dec-2018 21:40</b>				
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875222</b>		PrepDate:			DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Sulfate	12.96	0.500	10	2.851	101	80 - 120			
<b>MS</b>	Sample ID: <b>HS18120344-01MS</b>	Units: <b>mg/L</b>			Analysis Date: <b>20-Dec-2018 02:31</b>				
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875242</b>		PrepDate:			DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Sulfate	31.64	0.500	10	21.78	98.6	80 - 120			
<b>MSD</b>	Sample ID: <b>HS18121069-05MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>19-Dec-2018 21:55</b>				
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875223</b>		PrepDate:			DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Sulfate	12.77	0.500	10	2.851	99.2	80 - 120	12.96	1.51	20

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QC BATCH REPORT**

**Batch ID:** R329653      **Instrument:** ICS2100      **Method:** E300

**MSD**      Sample ID: **HS18120344-01MSD**      Units: **mg/L**      Analysis Date: **20-Dec-2018 02:46**  
 Client ID:      Run ID: **ICS2100\_329653**      SeqNo: **4875243**      PrepDate:      DF: **1**  
 Analyte      Result      PQL      SPK Val      SPK Ref Value      %REC      Control Limit      RPD Ref Value      %RPD      RPD Limit Qual

Sulfate	32.67	0.500	10	21.78	109	80 - 120	31.64	3.21	20
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The following samples were analyzed in this batch: 

HS18120251-01	HS18120251-02
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**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120251

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
North Carolina	624-2018	31-Dec-2018
Arkansas	88-0356	27-Mar-2019
Texas	T10470231-18-21	30-Apr-2019
North Dakota	R193 2018-2019	30-Apr-2019
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	22-Dec-2018
Kentucky	123043 - 2018	30-Apr-2019
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019

---

Sample Receipt Checklist

Client Name: BurnsMcDonnell-KansasCity
Work Order: HS18120251

Date/Time Received: 06-Dec-2018 09:00
Received by: JRM

Checklist completed by: Jared R. Makan
eSignature
Date: 6-Dec-2018

Reviewed by: Bernadette A. Fini
eSignature
Date: 6-Dec-2018

Matrices: Water

Carrier name: ALS Courier

- Shipping container/cooler in good condition? Yes [checked] No [ ] Not Present [ ]
Custody seals intact on shipping container/cooler? Yes [checked] No [ ] Not Present [ ]
Custody seals intact on sample bottles? Yes [ ] No [ ] Not Present [checked]
Chain of custody present? Yes [checked] No [ ]
Chain of custody signed when relinquished and received? Yes [checked] No [ ]
Chain of custody agrees with sample labels? Yes [checked] No [ ]
Samples in proper container/bottle? Yes [checked] No [ ]
Sample containers intact? Yes [checked] No [ ]
TX1005 solids received in hermetically sealed vials? Yes [ ] No [ ] N/A [checked]
Sufficient sample volume for indicated test? Yes [checked] No [ ]
All samples received within holding time? Yes [checked] No [ ]
Container/Temp Blank temperature in compliance? Yes [checked] No [ ]

Temperature(s)/Thermometer(s): 2.0c/2.4c UC/C IR11
Cooler(s)/Kit(s): 43887
Date/Time sample(s) sent to storage: 10/06/2018 10:10

- Water - VOA vials have zero headspace? Yes [checked] No [ ] No VOA vials submitted [ ]
Water - pH acceptable upon receipt? Yes [checked] No [ ] N/A [ ]
pH adjusted? Yes [ ] No [checked] N/A [ ]
pH adjusted by:

Login Notes: Received with limited holding time remaining

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:



Cincinnati, OH  
+1 513 733 5336

Fort Collins, CO  
+1 970 490 1511

Everett, WA  
+1 425 356 2600

Holland, MI  
+1 616 399 6070

# Chain of Custody Form

HS18120251

Burns & McDonnell  
SWMU 33 LTM Groundwater

Page 1 of 1

COC ID: **171053**



ALS Project Manager:

Customer Information		Project Information		
Purchase Order	Need	Project Name	SWMU 33 LTM Groundwater	A 8260_LL_W (Special List VOC 8260)
Work Order		Project Number	1066003	B RSK175 (M,E,E)
Company Name	Burns & McDonnell	Bill To Company	Burns & McDonnell	C 300_W (NO2,NO3,SO4)
Send Report To	Sharon Shelton	Invoice Attn	Accounts Payable	D ICP_TW (Mn only)
Address	9400 Ward Parkway	Address	9400 Ward Parkway	E SULFD_4500S F (Sulfide)
				F TOC_W 9060 (TOC)
				G
City/State/Zip	Kansas City, MO 64114	City/State/Zip	Kansas City MO 64114	H
Phone	(816) 822-3900	Phone	(816) 822-3900	I
Fax		Fax		J
e-Mail Address	sshelton@bumsmcd.com	e-Mail Address	supplierinvoices@bumsmcd.com	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	33 MW 52 / 6W01	12/4/18	1015	GW	ICE	11	X	X	X	X	X	X					
2	33 MW 5-1000 / 6W01 "DWP"	12/4/18	-	GW	ice	11	X	X	X	X	X	X					
3	33 MW 55 / 6W01	12/4/18	1200	GW	Ice	11	X	X	X	X	X	X					
4	33 MW 55 I / RW01 "Rinse"	12/4/18	1035	Rinse GW	ice	11	X	X	X	X	X	X					
5	33 MW 58 / 6W01	12/4/18	1435 1200	GW	ice	11	X	X	X	X	X	X					
6	33 MW 75 / 6W01	12/4/18	1550	GW	ice	11	X	X	X	X	X	X					
7	33 MW 7D / 6W01	12/4/18	1645	GW	ice	11	X	X	X	X	X	X					
8	Trip Blank	-	-	-	-	2											
9																	
10	<i>DWP</i>	12/4/18															

Sampler(s) Please Print & Sign <i>Dax Baker</i>		Shipment Method <i>Express Overnight</i>		Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> STD 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour				Results Due Date:			
Relinquished by: <i>Dax Baker</i>	Date: 12/4/18	Time: 0730	Received by:	Notes: BM LTM Groundwater							
Relinquished by:	Date: 12-6-18	Time: 09:00	Received by (Laboratory): <i>JM</i>	Cooler ID: 43887	Cooler Temp.: 2.0	QC Package: (Check One Box Below)					
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	11	11	<input checked="" type="checkbox"/> Level II Std QC	<input type="checkbox"/> TRRP Checklist				
Preservative Key:	1-HCl	2-HNO <sub>3</sub>	3-H <sub>2</sub> SO <sub>4</sub>	4-NaOH	5-Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	6-NaHSO <sub>4</sub>	7-Other	8-4°C	9-5035	<input type="checkbox"/> Level III Std QC/Raw Data	<input type="checkbox"/> TRRP Level IV
										<input checked="" type="checkbox"/> Level IV SW846/CLP	
										<input type="checkbox"/> Other	

- Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
- Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
- The Chain of Custody is a legal document. All information must be completed accurately.

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**ALS**  
 10450 Stancliff Rd.,  
 Houston, Texas 77099  
 Tel. +1 281 530 5656  
 Fax. +1 281 530 5887

ie 210

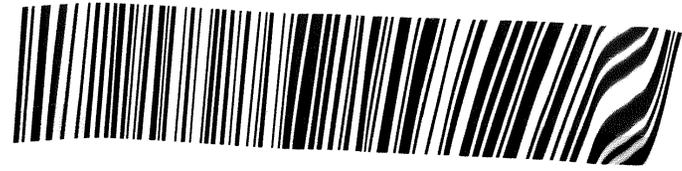
**CUSTODY SE**  
 Date: 12/12/2018  
 Name: CHUCK BRUNENBU  
 Company: BRUNENBU & McDONN  
 Time: 17:30

**FedEx**  
 TRK# 4380 9534 2396  
 0221

WED - 05 DEC 10:30A T  
 PRIORITY 0 VERNIGHT T

**NH SGRA**

77099 9  
 TX-US IAH  
 8/10/18



#2639319 12/04 552J2/E4AF/DCAS



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

December 21, 2018

Sharon Shelton  
Burns & McDonnell  
9400 Ward Parkway  
Kansas City, MO 64114

Work Order: **HS18120266**

Laboratory Results for: **SWMU 33 LTM Groundwater**

Dear Sharon,

ALS Environmental received 6 sample(s) on Dec 06, 2018 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL  
Bernadette A. Fini  
Project Manager

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**Work Order:** HS18120266

**SAMPLE SUMMARY**

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS18120266-01	33MW11S / GW01	Groundwater		05-Dec-2018 09:40	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120266-02	33MW11D / GW01	Groundwater		05-Dec-2018 10:45	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120266-03	33MW8S / GW01	Groundwater		05-Dec-2018 11:55	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120266-04	33MW8-1000 / GW01 "DUP"	Groundwater		05-Dec-2018 00:00	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120266-05	33MW6D / GW01	Groundwater		05-Dec-2018 13:05	06-Dec-2018 09:00	<input type="checkbox"/>
HS18120266-06	Trip Blank	Water	C&G- 101618-239	05-Dec-2018 00:00	06-Dec-2018 09:00	<input type="checkbox"/>

---

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**Work Order:** HS18120266

---

**CASE NARRATIVE**

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**GC Semivolatiles by Method RSK-175**

**Batch ID: R329609**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**GCMS Volatiles by Method SW8260**

**Batch ID: R329601**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**Metals by Method SW6020**

**Batch ID: 135642**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method SW9060**

**Batch ID: R329406**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method SM4500 S2-F**

**Batch ID: R329295**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E300**

**Batch ID: R328810**

**Sample ID: CCV**

- The associated CCV %D was above the upper acceptance limit. The high CCV recovery does not affect the non-detect results for analyte(s): (Nitrogen, Nitrite (As N))

**Sample ID: HS18120280-01MS**

- MS and MSD are for an unrelated sample (Sulfate)

**Batch ID: R329653**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW11S / GW01  
 Collection Date: 05-Dec-2018 09:40

**ANALYTICAL REPORT**

WorkOrder:HS18120266  
 Lab ID:HS18120266-01  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: PC		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:30
1,1,2-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:30
1,1-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:30
1,1-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:30
1,2-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:30
Acetone	ND		2.0	ug/L	1	19-Dec-2018 17:30
Benzene	ND		1.0	ug/L	1	19-Dec-2018 17:30
Carbon disulfide	ND		2.0	ug/L	1	19-Dec-2018 17:30
Chloroform	ND		1.0	ug/L	1	19-Dec-2018 17:30
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:30
Ethylbenzene	ND		1.0	ug/L	1	19-Dec-2018 17:30
Methylene chloride	ND		2.0	ug/L	1	19-Dec-2018 17:30
Tetrachloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:30
Toluene	ND		1.0	ug/L	1	19-Dec-2018 17:30
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:30
Trichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:30
Vinyl chloride	ND		1.0	ug/L	1	19-Dec-2018 17:30
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	19-Dec-2018 17:30
Xylenes, Total	ND		1.0	ug/L	1	19-Dec-2018 17:30
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>91.7</i>		<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 17:30</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.0</i>		<i>81-113</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 17:30</i>
<i>Surr: Dibromofluoromethane</i>	<i>88.1</i>		<i>77-123</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 17:30</i>
<i>Surr: Toluene-d8</i>	<i>106</i>		<i>82-127</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 17:30</i>
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>		Analyst: PVL		
Ethane	ND		1.00	ug/L	1	19-Dec-2018 17:11
Ethene	ND		1.00	ug/L	1	19-Dec-2018 17:11
<b>Methane</b>	<b>9.66</b>		<b>0.500</b>	<b>ug/L</b>	<b>1</b>	19-Dec-2018 17:11
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>		Prep:SW3010A / 14-Dec-2018		Analyst: RPM
<b>Manganese</b>	<b>0.944</b>		<b>0.00500</b>	<b>mg/L</b>	<b>1</b>	17-Dec-2018 20:05
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>		Analyst: KMU		
Nitrogen, Nitrate (As N)	ND		0.100	mg/L	1	06-Dec-2018 22:35
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	06-Dec-2018 22:35
<b>Sulfate</b>	<b>38.0</b>		<b>0.500</b>	<b>mg/L</b>	<b>1</b>	06-Dec-2018 22:35
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>		Analyst: KVL		
<b>Sulfide</b>	<b>2.24</b>		<b>1.00</b>	<b>mg/L</b>	<b>1</b>	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>		Analyst: AJH		
<b>Organic Carbon, Total</b>	<b>7.76</b>		<b>1.00</b>	<b>mg/L</b>	<b>1</b>	17-Dec-2018 19:08

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW11D / GW01  
 Collection Date: 05-Dec-2018 10:45

**ANALYTICAL REPORT**

WorkOrder:HS18120266  
 Lab ID:HS18120266-02  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: PC		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:55
1,1,2-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:55
1,1-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:55
1,1-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:55
1,2-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:55
<b>Acetone</b>	<b>3.0</b>		<b>2.0</b>	<b>ug/L</b>	1	19-Dec-2018 17:55
Benzene	ND		1.0	ug/L	1	19-Dec-2018 17:55
Carbon disulfide	ND		2.0	ug/L	1	19-Dec-2018 17:55
Chloroform	ND		1.0	ug/L	1	19-Dec-2018 17:55
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:55
Ethylbenzene	ND		1.0	ug/L	1	19-Dec-2018 17:55
Methylene chloride	ND		2.0	ug/L	1	19-Dec-2018 17:55
Tetrachloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:55
Toluene	ND		1.0	ug/L	1	19-Dec-2018 17:55
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:55
Trichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:55
Vinyl chloride	ND		1.0	ug/L	1	19-Dec-2018 17:55
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	19-Dec-2018 17:55
Xylenes, Total	ND		1.0	ug/L	1	19-Dec-2018 17:55
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>92.3</i>		<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 17:55</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.4</i>		<i>81-113</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 17:55</i>
<i>Surr: Dibromofluoromethane</i>	<i>88.8</i>		<i>77-123</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 17:55</i>
<i>Surr: Toluene-d8</i>	<i>105</i>		<i>82-127</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 17:55</i>
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>		Analyst: PVL		
<b>Ethane</b>	<b>1.12</b>		<b>1.00</b>	<b>ug/L</b>	1	19-Dec-2018 17:33
<b>Ethene</b>	<b>2.82</b>		<b>1.00</b>	<b>ug/L</b>	1	19-Dec-2018 17:33
<b>Methane</b>	<b>103</b>		<b>2.50</b>	<b>ug/L</b>	5	19-Dec-2018 17:50
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>		Prep:SW3010A / 14-Dec-2018		Analyst: RPM
<b>Manganese</b>	<b>0.634</b>		<b>0.00500</b>	<b>mg/L</b>	1	17-Dec-2018 20:19
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>		Analyst: KMU		
Nitrogen, Nitrate (As N)	ND		0.100	mg/L	1	06-Dec-2018 23:19
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	06-Dec-2018 23:19
<b>Sulfate</b>	<b>12.9</b>		<b>0.500</b>	<b>mg/L</b>	1	06-Dec-2018 23:19
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>		Analyst: KVL		
<b>Sulfide</b>	<b>1.84</b>		<b>1.00</b>	<b>mg/L</b>	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>		Analyst: AJH		
<b>Organic Carbon, Total</b>	<b>3.17</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 19:25

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW8S / GW01  
 Collection Date: 05-Dec-2018 11:55

**ANALYTICAL REPORT**  
 WorkOrder:HS18120266  
 Lab ID:HS18120266-03  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: PC		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 18:45
1,1,2-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 18:45
<b>1,1-Dichloroethane</b>	<b>9.5</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 18:45
1,1-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 18:45
1,2-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 18:45
Acetone	ND		2.0	ug/L	1	19-Dec-2018 18:45
Benzene	ND		1.0	ug/L	1	19-Dec-2018 18:45
Carbon disulfide	ND		2.0	ug/L	1	19-Dec-2018 18:45
Chloroform	ND		1.0	ug/L	1	19-Dec-2018 18:45
<b>cis-1,2-Dichloroethene</b>	<b>78</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 18:45
Ethylbenzene	ND		1.0	ug/L	1	19-Dec-2018 18:45
Methylene chloride	ND		2.0	ug/L	1	19-Dec-2018 18:45
Tetrachloroethene	ND		1.0	ug/L	1	19-Dec-2018 18:45
Toluene	ND		1.0	ug/L	1	19-Dec-2018 18:45
<b>trans-1,2-Dichloroethene</b>	<b>1.6</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 18:45
<b>Trichloroethene</b>	<b>39</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 18:45
Vinyl chloride	ND		1.0	ug/L	1	19-Dec-2018 18:45
<b>1,2-Dichloroethene, Total</b>	<b>79</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 18:45
Xylenes, Total	ND		1.0	ug/L	1	19-Dec-2018 18:45
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>90.2</i>		<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 18:45</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.1</i>		<i>81-113</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 18:45</i>
<i>Surr: Dibromofluoromethane</i>	<i>88.0</i>		<i>77-123</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 18:45</i>
<i>Surr: Toluene-d8</i>	<i>106</i>		<i>82-127</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 18:45</i>
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>		Analyst: PVL		
Ethane	ND		1.00	ug/L	1	19-Dec-2018 18:02
<b>Ethene</b>	<b>1.36</b>		<b>1.00</b>	<b>ug/L</b>	1	19-Dec-2018 18:02
<b>Methane</b>	<b>8.64</b>		<b>0.500</b>	<b>ug/L</b>	1	19-Dec-2018 18:02
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>		Prep:SW3010A / 14-Dec-2018		Analyst: RPM
<b>Manganese</b>	<b>0.632</b>		<b>0.00500</b>	<b>mg/L</b>	1	17-Dec-2018 20:21
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>		Analyst: KMU		
Nitrogen, Nitrate (As N)	ND		0.100	mg/L	1	06-Dec-2018 23:33
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	06-Dec-2018 23:33
<b>Sulfate</b>	<b>279</b>		<b>5.00</b>	<b>mg/L</b>	10	20-Dec-2018 01:33
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>		Analyst: KVL		
<b>Sulfide</b>	<b>1.84</b>		<b>1.00</b>	<b>mg/L</b>	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>		Analyst: AJH		
<b>Organic Carbon, Total</b>	<b>2.60</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 20:15

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW8-1000 / GW01 "DUP"  
 Collection Date: 05-Dec-2018 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS18120266  
 Lab ID:HS18120266-04  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: PC		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 19:09
1,1,2-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 19:09
<b>1,1-Dichloroethane</b>	<b>9.9</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 19:09
1,1-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 19:09
1,2-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 19:09
Acetone	ND		2.0	ug/L	1	19-Dec-2018 19:09
Benzene	ND		1.0	ug/L	1	19-Dec-2018 19:09
Carbon disulfide	ND		2.0	ug/L	1	19-Dec-2018 19:09
Chloroform	ND		1.0	ug/L	1	19-Dec-2018 19:09
<b>cis-1,2-Dichloroethene</b>	<b>83</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 19:09
Ethylbenzene	ND		1.0	ug/L	1	19-Dec-2018 19:09
Methylene chloride	ND		2.0	ug/L	1	19-Dec-2018 19:09
Tetrachloroethene	ND		1.0	ug/L	1	19-Dec-2018 19:09
Toluene	ND		1.0	ug/L	1	19-Dec-2018 19:09
<b>trans-1,2-Dichloroethene</b>	<b>1.7</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 19:09
<b>Trichloroethene</b>	<b>42</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 19:09
Vinyl chloride	ND		1.0	ug/L	1	19-Dec-2018 19:09
<b>1,2-Dichloroethene, Total</b>	<b>85</b>		<b>1.0</b>	<b>ug/L</b>	1	19-Dec-2018 19:09
Xylenes, Total	ND		1.0	ug/L	1	19-Dec-2018 19:09
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>92.2</i>		<i>70-126</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 19:09</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>97.3</i>		<i>81-113</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 19:09</i>
<i>Surr: Dibromofluoromethane</i>	<i>87.8</i>		<i>77-123</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 19:09</i>
<i>Surr: Toluene-d8</i>	<i>105</i>		<i>82-127</i>	<i>%REC</i>	<i>1</i>	<i>19-Dec-2018 19:09</i>
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>		Analyst: PVL		
Ethane	ND		1.00	ug/L	1	19-Dec-2018 18:13
<b>Ethene</b>	<b>3.28</b>		<b>1.00</b>	<b>ug/L</b>	1	19-Dec-2018 18:13
<b>Methane</b>	<b>6.72</b>		<b>0.500</b>	<b>ug/L</b>	1	19-Dec-2018 18:13
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>		Prep:SW3010A / 14-Dec-2018		Analyst: RPM
<b>Manganese</b>	<b>0.623</b>		<b>0.00500</b>	<b>mg/L</b>	1	17-Dec-2018 20:23
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>		Analyst: KMU		
Nitrogen, Nitrate (As N)	ND		0.100	mg/L	1	06-Dec-2018 23:48
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	06-Dec-2018 23:48
<b>Sulfate</b>	<b>280</b>		<b>5.00</b>	<b>mg/L</b>	10	20-Dec-2018 01:48
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>		Analyst: KVL		
<b>Sulfide</b>	<b>1.24</b>		<b>1.00</b>	<b>mg/L</b>	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>		Analyst: AJH		
<b>Organic Carbon, Total</b>	<b>2.62</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 20:30

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW6D / GW01  
 Collection Date: 05-Dec-2018 13:05

**ANALYTICAL REPORT**  
 WorkOrder:HS18120266  
 Lab ID:HS18120266-05  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>				Analyst: PC
1,1,1-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 18:20
1,1,2-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 18:20
1,1-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 18:20
1,1-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 18:20
1,2-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 18:20
Acetone	ND		2.0	ug/L	1	19-Dec-2018 18:20
Benzene	ND		1.0	ug/L	1	19-Dec-2018 18:20
Carbon disulfide	ND		2.0	ug/L	1	19-Dec-2018 18:20
Chloroform	ND		1.0	ug/L	1	19-Dec-2018 18:20
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 18:20
Ethylbenzene	ND		1.0	ug/L	1	19-Dec-2018 18:20
Methylene chloride	ND		2.0	ug/L	1	19-Dec-2018 18:20
Tetrachloroethene	ND		1.0	ug/L	1	19-Dec-2018 18:20
Toluene	ND		1.0	ug/L	1	19-Dec-2018 18:20
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 18:20
Trichloroethene	ND		1.0	ug/L	1	19-Dec-2018 18:20
Vinyl chloride	ND		1.0	ug/L	1	19-Dec-2018 18:20
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	19-Dec-2018 18:20
Xylenes, Total	ND		1.0	ug/L	1	19-Dec-2018 18:20
<i>Surr: 1,2-Dichloroethane-d4</i>	93.1		70-126	%REC	1	19-Dec-2018 18:20
<i>Surr: 4-Bromofluorobenzene</i>	96.4		81-113	%REC	1	19-Dec-2018 18:20
<i>Surr: Dibromofluoromethane</i>	89.3		77-123	%REC	1	19-Dec-2018 18:20
<i>Surr: Toluene-d8</i>	104		82-127	%REC	1	19-Dec-2018 18:20
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>				Analyst: PVL
Ethane	ND		1.00	ug/L	1	19-Dec-2018 18:29
Ethene	ND		1.00	ug/L	1	19-Dec-2018 18:29
<b>Methane</b>	<b>14.1</b>		<b>0.500</b>	<b>ug/L</b>	1	19-Dec-2018 18:29
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>			Prep:SW3010A / 14-Dec-2018	Analyst: RPM
<b>Manganese</b>	<b>1.38</b>		<b>0.00500</b>	<b>mg/L</b>	1	17-Dec-2018 20:25
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>				Analyst: KMU
Nitrogen, Nitrate (As N)	ND		0.100	mg/L	1	07-Dec-2018 00:03
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	07-Dec-2018 00:03
<b>Sulfate</b>	<b>105</b>		<b>1.00</b>	<b>mg/L</b>	2	20-Dec-2018 02:02
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>				Analyst: KVL
<b>Sulfide</b>	<b>2.44</b>		<b>1.00</b>	<b>mg/L</b>	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>				Analyst: AJH
<b>Organic Carbon, Total</b>	<b>2.80</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 20:47

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: Trip Blank  
 Collection Date: 05-Dec-2018 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS18120266  
 Lab ID:HS18120266-06  
 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: PC		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:05
1,1,2-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:05
1,1-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:05
1,1-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:05
1,2-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 17:05
Acetone	ND		2.0	ug/L	1	19-Dec-2018 17:05
Benzene	ND		1.0	ug/L	1	19-Dec-2018 17:05
Carbon disulfide	ND		2.0	ug/L	1	19-Dec-2018 17:05
Chloroform	ND		1.0	ug/L	1	19-Dec-2018 17:05
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:05
Ethylbenzene	ND		1.0	ug/L	1	19-Dec-2018 17:05
Methylene chloride	ND		2.0	ug/L	1	19-Dec-2018 17:05
Tetrachloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:05
Toluene	ND		1.0	ug/L	1	19-Dec-2018 17:05
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:05
Trichloroethene	ND		1.0	ug/L	1	19-Dec-2018 17:05
Vinyl chloride	ND		1.0	ug/L	1	19-Dec-2018 17:05
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	19-Dec-2018 17:05
Xylenes, Total	ND		1.0	ug/L	1	19-Dec-2018 17:05
<i>Surr: 1,2-Dichloroethane-d4</i>	91.6		70-126	%REC	1	19-Dec-2018 17:05
<i>Surr: 4-Bromofluorobenzene</i>	97.4		81-113	%REC	1	19-Dec-2018 17:05
<i>Surr: Dibromofluoromethane</i>	89.2		77-123	%REC	1	19-Dec-2018 17:05
<i>Surr: Toluene-d8</i>	104		82-127	%REC	1	19-Dec-2018 17:05

Note: See Qualifiers Page for a list of qualifiers and their explanation.

**WEIGHT LOG**

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**Batch ID:** 135642      **Method:** ICP-MS METALS BY SW6020A      **Prep:** 3010A

SamplID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS18120266-01	1	10	10 (mL)	1
HS18120266-02	1	10	10 (mL)	1
HS18120266-03	1	10	10 (mL)	1
HS18120266-04	1	10	10 (mL)	1
HS18120266-05	1	10	10 (mL)	1

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID</b> 135642	<b>Test Name :</b> ICP-MS METALS BY SW6020A			<b>Matrix:</b> Groundwater		
HS18120266-01	33MW11S / GW01	05 Dec 2018 09:40		14 Dec 2018 11:00	17 Dec 2018 20:05	1
HS18120266-02	33MW11D / GW01	05 Dec 2018 10:45		14 Dec 2018 11:00	17 Dec 2018 20:19	1
HS18120266-03	33MW8S / GW01	05 Dec 2018 11:55		14 Dec 2018 11:00	17 Dec 2018 20:21	1
HS18120266-04	33MW8-1000 / GW01 "DUP"	05 Dec 2018 00:00		14 Dec 2018 11:00	17 Dec 2018 20:23	1
HS18120266-05	33MW6D / GW01	05 Dec 2018 13:05		14 Dec 2018 11:00	17 Dec 2018 20:25	1
<b>Batch ID</b> R328810	<b>Test Name :</b> ANIONS BY E300.0			<b>Matrix:</b> Groundwater		
HS18120266-01	33MW11S / GW01	05 Dec 2018 09:40			06 Dec 2018 22:35	1
HS18120266-02	33MW11D / GW01	05 Dec 2018 10:45			06 Dec 2018 23:19	1
HS18120266-03	33MW8S / GW01	05 Dec 2018 11:55			06 Dec 2018 23:33	1
HS18120266-04	33MW8-1000 / GW01 "DUP"	05 Dec 2018 00:00			06 Dec 2018 23:48	1
HS18120266-05	33MW6D / GW01	05 Dec 2018 13:05			07 Dec 2018 00:03	1
<b>Batch ID</b> R329295	<b>Test Name :</b> SULFIDE BY SM4500 S2-F			<b>Matrix:</b> Groundwater		
HS18120266-01	33MW11S / GW01	05 Dec 2018 09:40			11 Dec 2018 17:00	1
HS18120266-02	33MW11D / GW01	05 Dec 2018 10:45			11 Dec 2018 17:00	1
HS18120266-03	33MW8S / GW01	05 Dec 2018 11:55			11 Dec 2018 17:00	1
HS18120266-04	33MW8-1000 / GW01 "DUP"	05 Dec 2018 00:00			11 Dec 2018 17:00	1
HS18120266-05	33MW6D / GW01	05 Dec 2018 13:05			11 Dec 2018 17:00	1
<b>Batch ID</b> R329406	<b>Test Name :</b> TOTAL ORGANIC CARBON BY SW9060A			<b>Matrix:</b> Groundwater		
HS18120266-01	33MW11S / GW01	05 Dec 2018 09:40			17 Dec 2018 19:08	1
HS18120266-02	33MW11D / GW01	05 Dec 2018 10:45			17 Dec 2018 19:25	1
HS18120266-03	33MW8S / GW01	05 Dec 2018 11:55			17 Dec 2018 20:15	1
HS18120266-04	33MW8-1000 / GW01 "DUP"	05 Dec 2018 00:00			17 Dec 2018 20:30	1
HS18120266-05	33MW6D / GW01	05 Dec 2018 13:05			17 Dec 2018 20:47	1
<b>Batch ID</b> R329601	<b>Test Name :</b> LOW LEVEL VOLATILES BY SW8260C			<b>Matrix:</b> Water		
HS18120266-06	Trip Blank	05 Dec 2018 00:00			19 Dec 2018 17:05	1
<b>Batch ID</b> R329601	<b>Test Name :</b> LOW LEVEL VOLATILES BY SW8260C			<b>Matrix:</b> Groundwater		
HS18120266-01	33MW11S / GW01	05 Dec 2018 09:40			19 Dec 2018 17:30	1
HS18120266-02	33MW11D / GW01	05 Dec 2018 10:45			19 Dec 2018 17:55	1
HS18120266-03	33MW8S / GW01	05 Dec 2018 11:55			19 Dec 2018 18:45	1
HS18120266-04	33MW8-1000 / GW01 "DUP"	05 Dec 2018 00:00			19 Dec 2018 19:09	1
HS18120266-05	33MW6D / GW01	05 Dec 2018 13:05			19 Dec 2018 18:20	1

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID</b> R329609		<b>Test Name :</b> DISSOLVED GASES BY RSK-175			<b>Matrix:</b> Groundwater	
HS18120266-01	33MW11S / GW01	05 Dec 2018 09:40			19 Dec 2018 17:11	1
HS18120266-02	33MW11D / GW01	05 Dec 2018 10:45			19 Dec 2018 17:50	5
HS18120266-02	33MW11D / GW01	05 Dec 2018 10:45			19 Dec 2018 17:33	1
HS18120266-03	33MW8S / GW01	05 Dec 2018 11:55			19 Dec 2018 18:02	1
HS18120266-04	33MW8-1000 / GW01 "DUP"	05 Dec 2018 00:00			19 Dec 2018 18:13	1
HS18120266-05	33MW6D / GW01	05 Dec 2018 13:05			19 Dec 2018 18:29	1
<b>Batch ID</b> R329653		<b>Test Name :</b> ANIONS BY E300.0			<b>Matrix:</b> Groundwater	
HS18120266-03	33MW8S / GW01	05 Dec 2018 11:55			20 Dec 2018 01:33	10
HS18120266-04	33MW8-1000 / GW01 "DUP"	05 Dec 2018 00:00			20 Dec 2018 01:48	10
HS18120266-05	33MW6D / GW01	05 Dec 2018 13:05			20 Dec 2018 02:02	2

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

**Batch ID:** R329609      **Instrument:** FID-4      **Method:** RSK-175

<b>MBLK</b>		Sample ID: <b>MBLK-181219</b>		Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 13:46</b>			
Client ID:		Run ID: <b>FID-4_329609</b>		SeqNo: <b>4873699</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	ND	1.00							
Ethene	ND	1.00							
Methane	ND	0.500							

<b>LCS</b>		Sample ID: <b>LCS-181219</b>		Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 12:52</b>			
Client ID:		Run ID: <b>FID-4_329609</b>		SeqNo: <b>4873697</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	17.93	1.00	18.04	0	99.4	75 - 125			
Ethene	18.89	1.00	16.8	0	112	75 - 125			
Methane	9.323	0.500	9.647	0	96.6	75 - 125			

<b>LCS D</b>		Sample ID: <b>LCS D-181219</b>		Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 13:12</b>			
Client ID:		Run ID: <b>FID-4_329609</b>		SeqNo: <b>4873698</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	17.41	1.00	18.04	0	96.5	75 - 125	17.93	2.93	30
Ethene	18.25	1.00	16.8	0	109	75 - 125	18.89	3.45	30
Methane	10.21	0.500	9.647	0	106	75 - 125	9.323	9.09	30

<b>DUP</b>		Sample ID: <b>HS18120733-06DUP</b>		Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 16:25</b>			
Client ID:		Run ID: <b>FID-4_329609</b>		SeqNo: <b>4873707</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	ND	1.00					0.5129	0	30
Ethene	1.504	1.00					1.554	3.24	30
Methane	2.947	0.500					3.235	9.32	30

The following samples were analyzed in this batch: HS18120266-01    HS18120266-02    HS18120266-03    HS18120266-04  
 HS18120266-05

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

Batch ID: 135642		Instrument: ICPMS05		Method: SW6020						
<b>MBLK</b>	Sample ID: <b>MBLK-135642</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Dec-2018 20:01</b>						
Client ID:	Run ID: <b>ICPMS05_329366</b>	SeqNo: <b>4869592</b>	PrepDate: <b>14-Dec-2018</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
Manganese	ND	0.00500								
<b>LCS</b>	Sample ID: <b>LCS-135642</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Dec-2018 20:03</b>						
Client ID:	Run ID: <b>ICPMS05_329366</b>	SeqNo: <b>4869593</b>	PrepDate: <b>14-Dec-2018</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
Manganese	0.05231	0.00500	0.05	0	105	80 - 120				
<b>MS</b>	Sample ID: <b>HS18120266-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Dec-2018 20:09</b>						
Client ID: <b>33MW11S / GW01</b>	Run ID: <b>ICPMS05_329366</b>	SeqNo: <b>4869596</b>	PrepDate: <b>14-Dec-2018</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
Manganese	1.001	0.00500	0.05	0.9442	114	80 - 120			O	
<b>MSD</b>	Sample ID: <b>HS18120266-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Dec-2018 20:11</b>						
Client ID: <b>33MW11S / GW01</b>	Run ID: <b>ICPMS05_329366</b>	SeqNo: <b>4869597</b>	PrepDate: <b>14-Dec-2018</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
Manganese	1.003	0.00500	0.05	0.9442	117	80 - 120	1.001	0.151	20 O	
<b>PDS</b>	Sample ID: <b>HS18120266-01PDS</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Dec-2018 20:13</b>						
Client ID: <b>33MW11S / GW01</b>	Run ID: <b>ICPMS05_329366</b>	SeqNo: <b>4869598</b>	PrepDate: <b>14-Dec-2018</b>	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	
Manganese	1.031	0.00500	0.1	0.9442	87.1	75 - 125			O	
<b>SD</b>	Sample ID: <b>HS18120266-01SD</b>	Units: <b>mg/L</b>		Analysis Date: <b>17-Dec-2018 20:07</b>						
Client ID: <b>33MW11S / GW01</b>	Run ID: <b>ICPMS05_329366</b>	SeqNo: <b>4869595</b>	PrepDate: <b>14-Dec-2018</b>	DF: <b>5</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	RPD Limit Qual	
Manganese	0.9772	0.0250					0.9442	3.5	10	

The following samples were analyzed in this batch: HS18120266-01 HS18120266-02 HS18120266-03 HS18120266-04  
 HS18120266-05

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

**Batch ID:** R329601      **Instrument:** VOA9      **Method:** SW8260

**MBLK**      Sample ID: **VBLKW-181219**      Units: **ug/L**      Analysis Date: **19-Dec-2018 14:12**  
 Client ID:      Run ID: **VOA9\_329601**      SeqNo: **4873560**      PrepDate:      DF: **1**  
 Analyte      Result      PQL      SPK Val      SPK Ref Value      %REC      Control Limit      RPD Ref Value      %RPD      RPD Limit Qual

1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloroethane	ND	1.0								
Acetone	ND	2.0								
Benzene	ND	1.0								
Carbon disulfide	ND	2.0								
Chloroform	ND	1.0								
cis-1,2-Dichloroethene	ND	1.0								
Ethylbenzene	ND	1.0								
Methylene chloride	ND	2.0								
Tetrachloroethene	ND	1.0								
Toluene	ND	1.0								
trans-1,2-Dichloroethene	ND	1.0								
Trichloroethene	ND	1.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.0								
1,2-Dichloroethene, Total	ND	1.0								
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>45.52</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>91.0</i>	<i>70 - 123</i>				
<i>Surr: 4-Bromofluorobenzene</i>	<i>48.78</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.6</i>	<i>82 - 115</i>				
<i>Surr: Dibromofluoromethane</i>	<i>43.82</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>87.6</i>	<i>73 - 126</i>				
<i>Surr: Toluene-d8</i>	<i>52.21</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>104</i>	<i>81 - 120</i>				

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

Batch ID: R329601		Instrument: VOA9		Method: SW8260						
<b>LCS</b>	Sample ID: <b>VLCSW-1812019</b>	Units: <b>ug/L</b>			Analysis Date: <b>19-Dec-2018 13:23</b>					
Client ID:	Run ID: <b>VOA9_329601</b>	SeqNo: <b>4873559</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	19.64	1.0	20	0	98.2	70 - 130				
1,1,2-Trichloroethane	21.95	1.0	20	0	110	77 - 113				
1,1-Dichloroethane	20.76	1.0	20	0	104	71 - 122				
1,1-Dichloroethene	18.1	1.0	20	0	90.5	70 - 130				
1,2-Dichloroethane	20.53	1.0	20	0	103	70 - 124				
Acetone	43.94	2.0	40	0	110	70 - 130				
Benzene	22.47	1.0	20	0	112	74 - 120				
Carbon disulfide	43	2.0	40	0	108	70 - 130				
Chloroform	19.61	1.0	20	0	98.0	71 - 121				
cis-1,2-Dichloroethene	20.47	1.0	20	0	102	75 - 122				
Ethylbenzene	22.22	1.0	20	0	111	77 - 117				
Methylene chloride	21.6	2.0	20	0	108	70 - 127				
Tetrachloroethene	22.72	1.0	20	0	114	76 - 119				
Toluene	22.34	1.0	20	0	112	77 - 118				
trans-1,2-Dichloroethene	20.96	1.0	20	0	105	72 - 127				
Trichloroethene	21.24	1.0	20	0	106	77 - 121				
Vinyl chloride	19.66	1.0	20	0	98.3	70 - 130				
Xylenes, Total	67.43	1.0	60	0	112	75 - 122				
1,2-Dichloroethene, Total	41.43	1.0	40	0	104	72 - 127				
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>43.64</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>87.3</i>	<i>70 - 130</i>				
<i>Surr: 4-Bromofluorobenzene</i>	<i>51.2</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>102</i>	<i>82 - 115</i>				
<i>Surr: Dibromofluoromethane</i>	<i>44.46</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>88.9</i>	<i>73 - 126</i>				
<i>Surr: Toluene-d8</i>	<i>52.77</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>106</i>	<i>81 - 120</i>				

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

Batch ID: R329601		Instrument: VOA9		Method: SW8260						
MS	Sample ID: HS18120734-01MS	Units: ug/L			Analysis Date: 19-Dec-2018 15:26					
Client ID:	Run ID: VOA9_329601	SeqNo: 4873562		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	21.6	1.0	20	0	108	70 - 130				
1,1,2-Trichloroethane	23.2	1.0	20	0	116	70 - 117				
1,1-Dichloroethane	22.17	1.0	20	0	111	70 - 127				
1,1-Dichloroethene	18.5	1.0	20	0	92.5	70 - 130				
1,2-Dichloroethane	22.31	1.0	20	0	112	70 - 127				
Acetone	38.91	2.0	40	0	97.3	70 - 130				
Benzene	24.5	1.0	20	0	123	70 - 127				
Carbon disulfide	45.07	2.0	40	0	113	70 - 130				
Chloroform	21.38	1.0	20	0	107	70 - 125				
cis-1,2-Dichloroethene	24.21	1.0	20	2.687	108	70 - 128				
Ethylbenzene	24.03	1.0	20	0	120	70 - 124				
Methylene chloride	23.42	2.0	20	0	117	70 - 128				
Tetrachloroethene	24.23	1.0	20	0	121	70 - 130				
Toluene	24.29	1.0	20	0	121	70 - 123				
trans-1,2-Dichloroethene	22.56	1.0	20	0	113	70 - 130				
Trichloroethene	24.47	1.0	20	0.8775	118	70 - 129				
Vinyl chloride	16.71	1.0	20	0	83.6	70 - 130				
Xylenes, Total	73.41	1.0	60	0	122	70 - 130				
1,2-Dichloroethene, Total	46.77	1.0	40	2.687	110	70 - 130				
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>43.67</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>87.3</i>	<i>70 - 126</i>				
<i>Surr: 4-Bromofluorobenzene</i>	<i>51.51</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>103</i>	<i>81 - 113</i>				
<i>Surr: Dibromofluoromethane</i>	<i>44.82</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>89.6</i>	<i>77 - 123</i>				
<i>Surr: Toluene-d8</i>	<i>52.8</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>106</i>	<i>82 - 127</i>				

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

**Batch ID:** R329601      **Instrument:** VOA9      **Method:** SW8260

<b>MSD</b>		Sample ID: <b>HS18120734-01MSD</b>			Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 15:51</b>			
Client ID:		Run ID: <b>VOA9_329601</b>			SeqNo: <b>4873563</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	20.38	1.0	20	0	102	70 - 130	21.6	5.84	20	
1,1,2-Trichloroethane	22.38	1.0	20	0	112	70 - 117	23.2	3.64	20	
1,1-Dichloroethane	21.22	1.0	20	0	106	70 - 127	22.17	4.42	20	
1,1-Dichloroethene	18.27	1.0	20	0	91.4	70 - 130	18.5	1.22	20	
1,2-Dichloroethane	21.39	1.0	20	0	107	70 - 127	22.31	4.18	20	
Acetone	43.99	2.0	40	0	110	70 - 130	38.91	12.3	20	
Benzene	23.02	1.0	20	0	115	70 - 127	24.5	6.22	20	
Carbon disulfide	43.1	2.0	40	0	108	70 - 130	45.07	4.46	20	
Chloroform	20.2	1.0	20	0	101	70 - 125	21.38	5.67	20	
cis-1,2-Dichloroethene	23.17	1.0	20	2.687	102	70 - 128	24.21	4.4	20	
Ethylbenzene	22.94	1.0	20	0	115	70 - 124	24.03	4.62	20	
Methylene chloride	22.17	2.0	20	0	111	70 - 128	23.42	5.49	20	
Tetrachloroethene	23.5	1.0	20	0	118	70 - 130	24.23	3.05	20	
Toluene	23.06	1.0	20	0	115	70 - 123	24.29	5.16	20	
trans-1,2-Dichloroethene	20.91	1.0	20	0	105	70 - 130	22.56	7.59	20	
Trichloroethene	23.12	1.0	20	0.8775	111	70 - 129	24.47	5.68	20	
Vinyl chloride	16.07	1.0	20	0	80.3	70 - 130	16.71	3.91	20	
Xylenes, Total	69.74	1.0	60	0	116	70 - 130	73.41	5.12	20	
1,2-Dichloroethene, Total	44.08	1.0	40	2.687	103	70 - 130	46.77	5.93	20	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>43.51</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>87.0</i>	<i>70 - 126</i>	<i>43.67</i>	<i>0.368</i>	<i>20</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>51.46</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>103</i>	<i>81 - 113</i>	<i>51.51</i>	<i>0.0905</i>	<i>20</i>	
<i>Surr: Dibromofluoromethane</i>	<i>44.68</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>89.4</i>	<i>77 - 123</i>	<i>44.82</i>	<i>0.318</i>	<i>20</i>	
<i>Surr: Toluene-d8</i>	<i>52.72</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>105</i>	<i>82 - 127</i>	<i>52.8</i>	<i>0.158</i>	<i>20</i>	

The following samples were analyzed in this batch: 

HS18120266-01	HS18120266-02	HS18120266-03	HS18120266-04
HS18120266-05	HS18120266-06		

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

**Batch ID:** R328810      **Instrument:** ICS2100      **Method:** E300

<b>MBLK</b>		Sample ID: <b>WBLKW1-120618</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 18:57</b>			
Client ID:		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854039</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	ND	0.100							
Nitrogen, Nitrite (As N)	ND	0.100							
Sulfate	ND	0.500							

<b>LCS</b>		Sample ID: <b>WLCSW1-120618</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 19:12</b>			
Client ID:		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854040</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	4.015	0.100	4	0	100	90 - 110			
Nitrogen, Nitrite (As N)	4.353	0.100	4	0	109	90 - 110			
Sulfate	19.78	0.500	20	0	98.9	90 - 110			

<b>LCS D</b>		Sample ID: <b>WLCSDW1-120618</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 19:26</b>			
Client ID:		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854041</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	3.867	0.100	4	0	96.7	90 - 110	4.015	3.76	20
Nitrogen, Nitrite (As N)	4.215	0.100	4	0	105	90 - 110	4.353	3.22	20
Sulfate	19.12	0.500	20	0	95.6	90 - 110	19.78	3.4	20

<b>MS</b>		Sample ID: <b>HS18120280-01MS</b>		Units: <b>mg/L</b>		Analysis Date: <b>07-Dec-2018 01:01</b>			
Client ID:		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854059</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	2.87	0.100	2	0.756	106	80 - 120			
Nitrogen, Nitrite (As N)	2.114	0.100	2	0	106	80 - 120			
Sulfate	2379	0.500	10	2402	-230	80 - 120			SEO

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

**Batch ID:** R328810      **Instrument:** ICS2100      **Method:** E300

<b>MS</b>		Sample ID: <b>HS18120266-01MS</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 22:50</b>			
Client ID: <b>33MW11S / GW01</b>		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854050</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	1.897	0.100	2	0	94.8	80 - 120			
Nitrogen, Nitrite (As N)	2.061	0.100	2	0	103	80 - 120			
Sulfate	46.8	0.500	10	38.01	87.9	80 - 120			

<b>MSD</b>		Sample ID: <b>HS18120280-01MSD</b>		Units: <b>mg/L</b>		Analysis Date: <b>07-Dec-2018 01:15</b>			
Client ID:		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854060</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	2.921	0.100	2	0.756	108	80 - 120	2.87	1.76	20
Nitrogen, Nitrite (As N)	2.156	0.100	2	0	108	80 - 120	2.114	1.97	20
Sulfate	2428	0.500	10	2402	262	80 - 120	2379	2.05	20 SEO

<b>MSD</b>		Sample ID: <b>HS18120266-01MSD</b>		Units: <b>mg/L</b>		Analysis Date: <b>06-Dec-2018 23:04</b>			
Client ID: <b>33MW11S / GW01</b>		Run ID: <b>ICS2100_328810</b>		SeqNo: <b>4854051</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Nitrogen, Nitrate (As N)	1.888	0.100	2	0	94.4	80 - 120	1.897	0.476	20
Nitrogen, Nitrite (As N)	2.057	0.100	2	0	103	80 - 120	2.061	0.194	20
Sulfate	46.51	0.500	10	38.01	85.0	80 - 120	46.8	0.617	20

The following samples were analyzed in this batch: HS18120266-01    HS18120266-02    HS18120266-03    HS18120266-04  
 HS18120266-05

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

<b>Batch ID:</b> R329295	<b>Instrument:</b> WetChem_HS	<b>Method:</b> SM4500 S2-F
--------------------------	-------------------------------	----------------------------

<b>MBLK</b>	Sample ID: <b>MBLK-R329295</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866075</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide ND 1.00

<b>LCS</b>	Sample ID: <b>LCS-R329295</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866074</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide 21.84 1.00 25 0 87.4 85 - 115

<b>LCSD</b>	Sample ID: <b>LCSD-R329295</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866073</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide 21.64 1.00 25 0 86.6 85 - 115 21.84 0.92 20

<b>MS</b>	Sample ID: <b>HS18120251-07MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866076</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide 23.84 1.00 25 0.24 94.4 80 - 120

The following samples were analyzed in this batch: HS18120266-01 HS18120266-02 HS18120266-03 HS18120266-04  
 HS18120266-05

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

<b>Batch ID:</b> R329406	<b>Instrument:</b> TOC_02	<b>Method:</b> SW9060
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<b>MBLK</b>	Sample ID: <b>WBLKW1-121718</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 13:49</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868986</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total ND 1.00

<b>LCS</b>	Sample ID: <b>WLCSW1-121718</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 14:04</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868987</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total 9.777 1.00 10 0 97.8 85 - 115

<b>LCSD</b>	Sample ID: <b>WLCSDW1-121718</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 14:20</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868988</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total 9.752 1.00 10 0 97.5 85 - 115 9.777 0.256 20

<b>MS</b>	Sample ID: <b>HS18120372-01MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 14:52</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868990</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total 11.72 1.00 10 2.435 92.8 80 - 120

<b>MS</b>	Sample ID: <b>HS18120251-07MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 18:52</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4870394</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total 14.28 1.00 10 4.442 98.4 80 - 120

The following samples were analyzed in this batch: HS18120266-01 HS18120266-02 HS18120266-03 HS18120266-04  
 HS18120266-05

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

Batch ID: R329653		Instrument: ICS2100		Method: E300						
<b>MBLK</b>	Sample ID: <b>WBLKW1-121918</b>	Units: <b>mg/L</b>		Analysis Date: <b>19-Dec-2018 19:44</b>						
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875214</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	ND	0.500								
<b>LCS</b>	Sample ID: <b>WLCSW1-121918</b>	Units: <b>mg/L</b>		Analysis Date: <b>19-Dec-2018 19:58</b>						
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875215</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	19.06	0.500	20	0	95.3	90 - 110				
<b>LCSD</b>	Sample ID: <b>WLCSDW1-121918</b>	Units: <b>mg/L</b>		Analysis Date: <b>19-Dec-2018 20:13</b>						
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875216</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	19.72	0.500	20	0	98.6	90 - 110	19.06	3.39	20	
<b>MS</b>	Sample ID: <b>HS18121069-05MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>19-Dec-2018 21:40</b>						
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875222</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	12.96	0.500	10	2.851	101	80 - 120				
<b>MS</b>	Sample ID: <b>HS18120344-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>20-Dec-2018 02:31</b>						
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875242</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	31.64	0.500	10	21.78	98.6	80 - 120				
<b>MSD</b>	Sample ID: <b>HS18121069-05MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>19-Dec-2018 21:55</b>						
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875223</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	12.77	0.500	10	2.851	99.2	80 - 120	12.96	1.51	20	

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QC BATCH REPORT**

**Batch ID:** R329653      **Instrument:** ICS2100      **Method:** E300

<b>MSD</b>	Sample ID: <b>HS18120344-01MSD</b>	Units: <b>mg/L</b>			Analysis Date: <b>20-Dec-2018 02:46</b>					
Client ID:	Run ID: <b>ICS2100_329653</b>	SeqNo: <b>4875243</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfate	32.67	0.500	10	21.78	109	80 - 120	31.64	3.21	20	

The following samples were analyzed in this batch: 

HS18120266-03	HS18120266-04	HS18120266-05
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**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120266

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

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**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
North Carolina	624-2018	31-Dec-2018
Arkansas	88-0356	27-Mar-2019
Texas	T10470231-18-21	30-Apr-2019
North Dakota	R193 2018-2019	30-Apr-2019
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	22-Dec-2018
Kentucky	123043 - 2018	30-Apr-2019
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019

Sample Receipt Checklist

Client Name: BurnsMcDonnell-KansasCity
Work Order: HS18120266

Date/Time Received: 06-Dec-2018 09:00
Received by: JRM

Checklist completed by: Nilesh D. Ranchod
eSignature
Date: 6-Dec-2018

Reviewed by: Bernadette A. Fini
eSignature
Date: 6-Dec-2018

Matrices: Water

Carrier name: FedEx Priority Overnight

- Shipping container/cooler in good condition? Yes [checked] No [ ] Not Present [ ]
Custody seals intact on shipping container/cooler? Yes [checked] No [ ] Not Present [ ]
Custody seals intact on sample bottles? Yes [ ] No [ ] Not Present [checked]
Chain of custody present? Yes [checked] No [ ]
Chain of custody signed when relinquished and received? Yes [ ] No [checked]
Chain of custody agrees with sample labels? Yes [checked] No [ ]
Samples in proper container/bottle? Yes [checked] No [ ]
Sample containers intact? Yes [checked] No [ ]
TX1005 solids received in hermetically sealed vials? Yes [ ] No [ ] N/A [checked]
Sufficient sample volume for indicated test? Yes [checked] No [ ]
All samples received within holding time? Yes [checked] No [ ]
Container/Temp Blank temperature in compliance? Yes [checked] No [ ]

Temperature(s)/Thermometer(s): 1.4C / 1.8C UC/C IR # 11
Cooler(s)/Kit(s): 44386
Date/Time sample(s) sent to storage: 12/06/2018 12:55pm

- Water - VOA vials have zero headspace? Yes [checked] No [ ] No VOA vials submitted [ ]
Water - pH acceptable upon receipt? Yes [checked] No [ ] N/A [ ]
pH adjusted? Yes [ ] No [checked] N/A [ ]
pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:



Cincinnati, OH  
+1 513 733 5336  
Everett, WA  
+1 425 356 2600

Fort Collins, CO  
+1 970 490 1511  
Holland, MI  
+1 616 399 6070

# Chain of Custody Fo

Page 1 of 1

COC ID: **171054**

**HS18120266**

Burns & McDonnell  
SWMU 33 LTM Groundwater

ston, WV  
68

ALS Project Manager:



Customer Information		Project Information	
Purchase Order	Need	Project Name	SWMU 33 LTM Groundwater
Work Order		Project Number	106603
Company Name	Burns & McDonnell	Bill To Company	Burns & McDonnell
Send Report To	Sharon Shelton	Invoice Attn	Accounts Payable
Address	9400 Ward Parkway	Address	9400 Ward Parkway
City/State/Zip	Kansas City, MO 64114	City/State/Zip	Kansas City MO 64114
Phone	(816) 822-3900	Phone	(816) 822-3900
Fax		Fax	
e-Mail Address	sshelton@burnsmcd.com	e-Mail Address	supplierinvoices@burnsmcd.com

A	8260_LL_W (Special List VOC 8260)
B	RSK175 (M,E,E)
C	300_W (NO2,NO3,SO4)
D	ICP_TW (Mn only)
E	SULFD_4500S F (Sulfide)
F	TOC_W 9060 (TOC)
G	
H	
I	
J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	33MW115/GW01	12/5/18	0940	GW		11	X	X	X	X	X	X					
2	33MW110/GW01	12/5/18	1045	GW		11	X	X	X	X	X	X					
3	33MW85/GW01	12/5/18	1155	GW		11	X	X	X	X	X	X					
4	33MW8-1000/GW01 "Dup"	12/5/18	-	GW		11	X	X	X	X	X	X					
5	33MW60/GW01	12/5/18	1305	GW		11	X	X	X	X	X	X					
6	Trip Blank	12/5/18		GW		2	X	X	X	X	X	X					
<p><i>Check B 12/5/2018</i></p>																	

Sampler(s) Please Print & Sign <i>Chad Barten</i>		Shipment Method <i>Fedex overnight</i>		Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> STD: 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour			Results Due Date:	
Relinquished by:	Date: <i>12/5/18</i>	Time: <i>1800</i>	Received by:	Notes: <i>BM LTM Groundwater</i>				
Relinquished by:	Date: <i>12-6-18</i>	Time: <i>0900</i>	Received by (Laboratory): <i>JM</i>	Cooler ID	Cooler Temp.	QC Package: (Check One Box Below)		
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	<i>44386</i>	<i>4°C</i>	<input type="checkbox"/> Level II Std QC	<input type="checkbox"/> TRRP Checklist	
Preservative Key: 1-HCl 2-HNO <sub>3</sub> 3-H <sub>2</sub> SO <sub>4</sub> 4-NaOH 5-Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> 6-NaHSO <sub>4</sub> 7-Other 8-4°C 9-5035				<i>1LX</i>	<i>11</i>	<input type="checkbox"/> Level III Std QC/Raw Date	<input type="checkbox"/> TRRP Level IV	
				<i>CLP</i>	<i>+04</i>	<input checked="" type="checkbox"/> Level IV SW04/CLP	<input type="checkbox"/> Other	

- note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.  
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.  
3. The Chain of Custody is a legal document. All information must be completed accurately.

Copyright 2011 by ALS Environmental.

 <b>ALS</b> 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5887	<b>CUSTODY SEAL</b>		Seal Broken By: <i>SM</i>
	Date: <i>12/5/2018</i>	Time: <i>1730</i>	Date: <i>12/06/18</i>
44386		Name: <i>Carmel Burns &amp; MCDONALD</i>	
		Company: <i>Burns &amp; McDONALD</i>	

44386 DEC 06 2018



Must Deliver Next Business Day  
Time and Temperature Sensitive!

44386

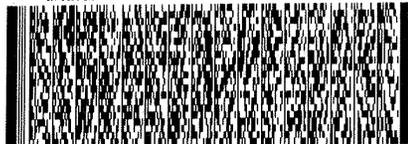
ORIGIN ID:SGRA (816) 822-3900  
SHARON SHELTON  
BURNS & MCDONALD  
9400 WARD PARKWAY  
KANSAS CITY, MO 64114  
UNITED STATES US

SHIP DATE: 05NOV18  
ACTWGT: 1.00 LB MAN  
CAD: 300130/CAFE3211  
DIMS: 26x14x14 IN

TO CLIENT SERVICES  
ALS LABORATORY GROUP  
10450 STANCLIFF ROAD  
SUITE 210  
HOUSTON TX 77099

(281) 530-6866  
REF: SWMU 33 LTM GW - BO 62021 - BF

RMA: ||| ||| |||



FedEx  
Express

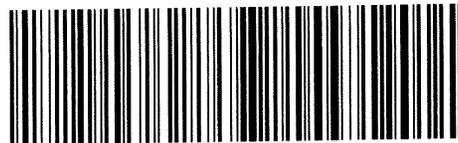


FedEx  
TRK# 4380 9534 2385  
0221

THU - 06 DEC 10:30A  
PRIORITY OVERNIGHT

NH SGRA

77099  
TX-US IAH



\*2629243 12/05 552J2/E4AF/DCAS



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10450 Stancliff Rd. Suite 210  
Houston, TX 77099  
T: +1 281 530 5656  
F: +1 281 530 5887

December 19, 2018

Sharon Shelton  
Burns & McDonnell  
9400 Ward Parkway  
Kansas City, MO 64114

Work Order: **HS18120372**

Laboratory Results for: **SWMU 33 LTM Groundwater**

Dear Sharon,

ALS Environmental received 3 sample(s) on Dec 07, 2018 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL  
Bernadette A. Fini  
Project Manager

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**Work Order:** HS18120372

**SAMPLE SUMMARY**

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Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS18120372-01	33MW16S / GW01	Groundwater		05-Dec-2018 14:10	07-Dec-2018 10:00	<input type="checkbox"/>
HS18120372-02	33MW16D / GW01	Groundwater		05-Dec-2018 15:15	07-Dec-2018 10:00	<input type="checkbox"/>
HS18120372-03	Trip Blank	Water	C&G- 101618-238	05-Dec-2018 00:00	07-Dec-2018 10:00	<input type="checkbox"/>

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**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**Work Order:** HS18120372

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**CASE NARRATIVE**

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**GC Semivolatiles by Method RSK-175**

**Batch ID: R329609**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**GCMS Volatiles by Method SW8260**

**Batch ID: R329539**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**Metals by Method SW6020**

**Batch ID: 135527**

**Sample ID: HS18120229-01MS**

- MS and MSD are for an unrelated sample
- 

**WetChemistry by Method SW9060**

**Batch ID: R329406**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method SM4500 S2-F**

**Batch ID: R329295**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
- 

**WetChemistry by Method E300**

**Batch ID: R328901**

**Sample ID: HS18120398-06MS**

- MS and MSD are for an unrelated sample (Sulfate)
-

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW16S / GW01  
 Collection Date: 05-Dec-2018 14:10

**ANALYTICAL REPORT**  
 WorkOrder:HS18120372  
 Lab ID:HS18120372-01  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>				Analyst: AKP
1,1,1-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 03:29
1,1,2-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 03:29
1,1-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 03:29
1,1-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:29
1,2-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 03:29
Acetone	ND		2.0	ug/L	1	19-Dec-2018 03:29
Benzene	ND		1.0	ug/L	1	19-Dec-2018 03:29
Carbon disulfide	ND		2.0	ug/L	1	19-Dec-2018 03:29
Chloroform	ND		1.0	ug/L	1	19-Dec-2018 03:29
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:29
Ethylbenzene	ND		1.0	ug/L	1	19-Dec-2018 03:29
Methylene chloride	ND		2.0	ug/L	1	19-Dec-2018 03:29
Tetrachloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:29
Toluene	ND		1.0	ug/L	1	19-Dec-2018 03:29
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:29
Trichloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:29
Vinyl chloride	ND		1.0	ug/L	1	19-Dec-2018 03:29
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	19-Dec-2018 03:29
Xylenes, Total	ND		1.0	ug/L	1	19-Dec-2018 03:29
<i>Surr: 1,2-Dichloroethane-d4</i>	89.4		70-126	%REC	1	19-Dec-2018 03:29
<i>Surr: 4-Bromofluorobenzene</i>	95.9		81-113	%REC	1	19-Dec-2018 03:29
<i>Surr: Dibromofluoromethane</i>	102		77-123	%REC	1	19-Dec-2018 03:29
<i>Surr: Toluene-d8</i>	99.7		82-127	%REC	1	19-Dec-2018 03:29
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>				Analyst: PVL
Ethane	ND		1.00	ug/L	1	19-Dec-2018 13:59
<b>Ethene</b>	<b>1.67</b>		<b>1.00</b>	<b>ug/L</b>	1	19-Dec-2018 13:59
<b>Methane</b>	<b>6.32</b>		<b>0.500</b>	<b>ug/L</b>	1	19-Dec-2018 13:59
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>			Prep:SW3010A / 12-Dec-2018	Analyst: ALR
<b>Manganese</b>	<b>7.69</b>		<b>0.0500</b>	<b>mg/L</b>	10	13-Dec-2018 21:28
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>				Analyst: KMU
<b>Nitrogen, Nitrate (As N)</b>	<b>0.114</b>		<b>0.100</b>	<b>mg/L</b>	1	07-Dec-2018 13:02
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	07-Dec-2018 13:02
<b>Sulfate</b>	<b>21.5</b>		<b>0.500</b>	<b>mg/L</b>	1	07-Dec-2018 13:02
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>				Analyst: KVL
Sulfide	ND		1.00	mg/L	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>				Analyst: AJH
<b>Organic Carbon, Total</b>	<b>2.44</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 14:35

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: 33MW16D / GW01  
 Collection Date: 05-Dec-2018 15:15

**ANALYTICAL REPORT**  
 WorkOrder:HS18120372  
 Lab ID:HS18120372-02  
 Matrix:Groundwater

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>				Analyst: AKP
1,1,1-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 03:53
1,1,2-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 03:53
1,1-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 03:53
1,1-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:53
1,2-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 03:53
Acetone	ND		2.0	ug/L	1	19-Dec-2018 03:53
Benzene	ND		1.0	ug/L	1	19-Dec-2018 03:53
Carbon disulfide	ND		2.0	ug/L	1	19-Dec-2018 03:53
Chloroform	ND		1.0	ug/L	1	19-Dec-2018 03:53
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:53
Ethylbenzene	ND		1.0	ug/L	1	19-Dec-2018 03:53
Methylene chloride	ND		2.0	ug/L	1	19-Dec-2018 03:53
Tetrachloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:53
Toluene	ND		1.0	ug/L	1	19-Dec-2018 03:53
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:53
Trichloroethene	ND		1.0	ug/L	1	19-Dec-2018 03:53
Vinyl chloride	ND		1.0	ug/L	1	19-Dec-2018 03:53
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	19-Dec-2018 03:53
Xylenes, Total	ND		1.0	ug/L	1	19-Dec-2018 03:53
<i>Surr: 1,2-Dichloroethane-d4</i>	87.9		70-126	%REC	1	19-Dec-2018 03:53
<i>Surr: 4-Bromofluorobenzene</i>	96.1		81-113	%REC	1	19-Dec-2018 03:53
<i>Surr: Dibromofluoromethane</i>	101		77-123	%REC	1	19-Dec-2018 03:53
<i>Surr: Toluene-d8</i>	99.6		82-127	%REC	1	19-Dec-2018 03:53
<b>DISSOLVED GASES BY RSK-175</b>		<b>Method:RSK-175</b>				Analyst: PVL
Ethane	ND		400	ug/L	400	19-Dec-2018 14:41
Ethene	ND		400	ug/L	400	19-Dec-2018 14:41
<b>Methane</b>	<b>2,130</b>		<b>200</b>	<b>ug/L</b>	400	19-Dec-2018 14:41
<b>ICP-MS METALS BY SW6020A</b>		<b>Method:SW6020</b>			Prep:SW3010A / 12-Dec-2018	Analyst: ALR
<b>Manganese</b>	<b>0.560</b>		<b>0.0500</b>	<b>mg/L</b>	10	13-Dec-2018 21:30
<b>ANIONS BY E300.0</b>		<b>Method:E300</b>				Analyst: KMU
Nitrogen, Nitrate (As N)	ND		0.100	mg/L	1	07-Dec-2018 13:16
Nitrogen, Nitrite (As N)	ND		0.100	mg/L	1	07-Dec-2018 13:16
Sulfate	ND		0.500	mg/L	1	07-Dec-2018 13:16
<b>SULFIDE BY SM4500 S2-F</b>		<b>Method:SM4500 S2-F</b>				Analyst: KVL
<b>Sulfide</b>	<b>1.64</b>		<b>1.00</b>	<b>mg/L</b>	1	11-Dec-2018 17:00
<b>TOTAL ORGANIC CARBON BY SW9060A</b>		<b>Method:SW9060</b>				Analyst: AJH
<b>Organic Carbon, Total</b>	<b>2.32</b>		<b>1.00</b>	<b>mg/L</b>	1	17-Dec-2018 15:10

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: Burns & McDonnell  
 Project: SWMU 33 LTM Groundwater  
 Sample ID: Trip Blank  
 Collection Date: 05-Dec-2018 00:00

**ANALYTICAL REPORT**  
 WorkOrder:HS18120372  
 Lab ID:HS18120372-03  
 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
<b>LOW LEVEL VOLATILES BY SW8260C</b>		<b>Method:SW8260</b>		Analyst: AKP		
1,1,1-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 00:40
1,1,2-Trichloroethane	ND		1.0	ug/L	1	19-Dec-2018 00:40
1,1-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 00:40
1,1-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 00:40
1,2-Dichloroethane	ND		1.0	ug/L	1	19-Dec-2018 00:40
Acetone	ND		2.0	ug/L	1	19-Dec-2018 00:40
Benzene	ND		1.0	ug/L	1	19-Dec-2018 00:40
Carbon disulfide	ND		2.0	ug/L	1	19-Dec-2018 00:40
Chloroform	ND		1.0	ug/L	1	19-Dec-2018 00:40
cis-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 00:40
Ethylbenzene	ND		1.0	ug/L	1	19-Dec-2018 00:40
Methylene chloride	ND		2.0	ug/L	1	19-Dec-2018 00:40
Tetrachloroethene	ND		1.0	ug/L	1	19-Dec-2018 00:40
Toluene	ND		1.0	ug/L	1	19-Dec-2018 00:40
trans-1,2-Dichloroethene	ND		1.0	ug/L	1	19-Dec-2018 00:40
Trichloroethene	ND		1.0	ug/L	1	19-Dec-2018 00:40
Vinyl chloride	ND		1.0	ug/L	1	19-Dec-2018 00:40
1,2-Dichloroethene, Total	ND		1.0	ug/L	1	19-Dec-2018 00:40
Xylenes, Total	ND		1.0	ug/L	1	19-Dec-2018 00:40
Surr: 1,2-Dichloroethane-d4	92.5		70-126	%REC	1	19-Dec-2018 00:40
Surr: 4-Bromofluorobenzene	104		81-113	%REC	1	19-Dec-2018 00:40
Surr: Dibromofluoromethane	97.1		77-123	%REC	1	19-Dec-2018 00:40
Surr: Toluene-d8	99.1		82-127	%REC	1	19-Dec-2018 00:40

Note: See Qualifiers Page for a list of qualifiers and their explanation.

**WEIGHT LOG**

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**Batch ID:** 135527      **Method:** ICP-MS METALS BY SW6020A      **Prep:** 3010A

SampleID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS18120372-01	1	10	10 (mL)	1
HS18120372-02	1	10	10 (mL)	1

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**DATES REPORT**

Sample ID	Client Samp ID	Collection Date	TCLP Date	Prep Date	Analysis Date	DF
<b>Batch ID</b> 135527	<b>Test Name :</b> ICP-MS METALS BY SW6020A		<b>Matrix:</b> Groundwater			
HS18120372-01	33MW16S / GW01	05 Dec 2018 14:10		12 Dec 2018 11:00	13 Dec 2018 21:28	10
HS18120372-02	33MW16D / GW01	05 Dec 2018 15:15		12 Dec 2018 11:00	13 Dec 2018 21:30	10
<b>Batch ID</b> R328901	<b>Test Name :</b> ANIONS BY E300.0		<b>Matrix:</b> Groundwater			
HS18120372-01	33MW16S / GW01	05 Dec 2018 14:10			07 Dec 2018 13:02	1
HS18120372-02	33MW16D / GW01	05 Dec 2018 15:15			07 Dec 2018 13:16	1
<b>Batch ID</b> R329295	<b>Test Name :</b> SULFIDE BY SM4500 S2-F		<b>Matrix:</b> Groundwater			
HS18120372-01	33MW16S / GW01	05 Dec 2018 14:10			11 Dec 2018 17:00	1
HS18120372-02	33MW16D / GW01	05 Dec 2018 15:15			11 Dec 2018 17:00	1
<b>Batch ID</b> R329406	<b>Test Name :</b> TOTAL ORGANIC CARBON BY SW9060A		<b>Matrix:</b> Groundwater			
HS18120372-01	33MW16S / GW01	05 Dec 2018 14:10			17 Dec 2018 14:35	1
HS18120372-02	33MW16D / GW01	05 Dec 2018 15:15			17 Dec 2018 15:10	1
<b>Batch ID</b> R329539	<b>Test Name :</b> LOW LEVEL VOLATILES BY SW8260C		<b>Matrix:</b> Water			
HS18120372-03	Trip Blank	05 Dec 2018 00:00			19 Dec 2018 00:40	1
<b>Batch ID</b> R329539	<b>Test Name :</b> LOW LEVEL VOLATILES BY SW8260C		<b>Matrix:</b> Groundwater			
HS18120372-01	33MW16S / GW01	05 Dec 2018 14:10			19 Dec 2018 03:29	1
HS18120372-02	33MW16D / GW01	05 Dec 2018 15:15			19 Dec 2018 03:53	1
<b>Batch ID</b> R329609	<b>Test Name :</b> DISSOLVED GASES BY RSK-175		<b>Matrix:</b> Groundwater			
HS18120372-01	33MW16S / GW01	05 Dec 2018 14:10			19 Dec 2018 13:59	1
HS18120372-02	33MW16D / GW01	05 Dec 2018 15:15			19 Dec 2018 14:41	400

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

**Batch ID:** R329609      **Instrument:** FID-4      **Method:** RSK-175

<b>MBLK</b>		Sample ID: <b>MBLK-181219</b>		Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 13:46</b>			
Client ID:		Run ID: <b>FID-4_329609</b>		SeqNo: <b>4873699</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	ND	1.00							
Ethene	ND	1.00							
Methane	ND	0.500							

<b>LCS</b>		Sample ID: <b>LCS-181219</b>		Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 12:52</b>			
Client ID:		Run ID: <b>FID-4_329609</b>		SeqNo: <b>4873697</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	17.93	1.00	18.04	0	99.4	75 - 125			
Ethene	18.89	1.00	16.8	0	112	75 - 125			
Methane	9.323	0.500	9.647	0	96.6	75 - 125			

<b>LCS D</b>		Sample ID: <b>LCS D-181219</b>		Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 13:12</b>			
Client ID:		Run ID: <b>FID-4_329609</b>		SeqNo: <b>4873698</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	17.41	1.00	18.04	0	96.5	75 - 125	17.93	2.93	30
Ethene	18.25	1.00	16.8	0	109	75 - 125	18.89	3.45	30
Methane	10.21	0.500	9.647	0	106	75 - 125	9.323	9.09	30

<b>DUP</b>		Sample ID: <b>HS18120733-06DUP</b>		Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 16:25</b>			
Client ID:		Run ID: <b>FID-4_329609</b>		SeqNo: <b>4873707</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	ND	1.00					0.5129	0	30
Ethene	1.504	1.00					1.554	3.24	30
Methane	2.947	0.500					3.235	9.32	30

The following samples were analyzed in this batch: HS18120372-01      HS18120372-02

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

Batch ID: 135527		Instrument: ICPMS05		Method: SW6020					
<b>MBLK</b>	Sample ID: <b>MBLK-135527</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Dec-2018 01:35</b>					
Client ID:	Run ID: <b>ICPMS05_329056</b>	SeqNo: <b>4862376</b>	PrepDate: <b>12-Dec-2018</b>	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Manganese	ND	0.00500							
<b>LCS</b>	Sample ID: <b>LCS-135527</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Dec-2018 01:38</b>					
Client ID:	Run ID: <b>ICPMS05_329056</b>	SeqNo: <b>4862377</b>	PrepDate: <b>12-Dec-2018</b>	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Manganese	0.05133	0.00500	0.05	0	103	80 - 120			
<b>MS</b>	Sample ID: <b>HS18120229-01MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Dec-2018 01:44</b>					
Client ID:	Run ID: <b>ICPMS05_329056</b>	SeqNo: <b>4862380</b>	PrepDate: <b>12-Dec-2018</b>	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Manganese	3.339	0.00500	0.05	3.378	-78.4	80 - 120			SEO
<b>MSD</b>	Sample ID: <b>HS18120229-01MSD</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Dec-2018 01:46</b>					
Client ID:	Run ID: <b>ICPMS05_329056</b>	SeqNo: <b>4862381</b>	PrepDate: <b>12-Dec-2018</b>	DF: <b>1</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Manganese	3.371	0.00500	0.05	3.378	-14.4	80 - 120	3.339	0.954	20 SEO
<b>PDS</b>	Sample ID: <b>HS18120229-01PDS</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Dec-2018 20:53</b>					
Client ID:	Run ID: <b>ICPMS05_329164</b>	SeqNo: <b>4863964</b>	PrepDate: <b>12-Dec-2018</b>	DF: <b>50</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
Manganese	8.998	0.250	5	3.589	108	75 - 125			
<b>SD</b>	Sample ID: <b>HS18120229-01SD</b>	Units: <b>mg/L</b>		Analysis Date: <b>13-Dec-2018 20:51</b>					
Client ID:	Run ID: <b>ICPMS05_329164</b>	SeqNo: <b>4863963</b>	PrepDate: <b>12-Dec-2018</b>	DF: <b>250</b>					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	RPD Limit Qual
Manganese	3.685	1.25					3.589	2.67	10

The following samples were analyzed in this batch: 

HS18120372-01	HS18120372-02
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**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

<b>Batch ID: R329539</b>		<b>Instrument: VOA2</b>		<b>Method: SW8260</b>					
<b>MBLK</b>	Sample ID: <b>VBLKW-181218</b>	Units: <b>ug/L</b>			Analysis Date: <b>18-Dec-2018 23:28</b>				
Client ID:	Run ID: <b>VOA2_329539</b>	SeqNo: <b>4872223</b>		PrepDate:			DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

1,1,1-Trichloroethane	ND	1.0							
1,1,2-Trichloroethane	ND	1.0							
1,1-Dichloroethane	ND	1.0							
1,1-Dichloroethene	ND	1.0							
1,2-Dichloroethane	ND	1.0							
Acetone	ND	2.0							
Benzene	ND	1.0							
Carbon disulfide	ND	2.0							
Chloroform	ND	1.0							
cis-1,2-Dichloroethene	ND	1.0							
Ethylbenzene	ND	1.0							
Methylene chloride	ND	2.0							
Tetrachloroethene	ND	1.0							
Toluene	ND	1.0							
trans-1,2-Dichloroethene	ND	1.0							
Trichloroethene	ND	1.0							
Vinyl chloride	ND	1.0							
Xylenes, Total	ND	1.0							
1,2-Dichloroethene, Total	ND	1.0							
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>45.3</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>90.6</i>	<i>70 - 123</i>			
<i>Surr: 4-Bromofluorobenzene</i>	<i>44.31</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>88.6</i>	<i>82 - 115</i>			
<i>Surr: Dibromofluoromethane</i>	<i>50.11</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>100</i>	<i>73 - 126</i>			
<i>Surr: Toluene-d8</i>	<i>50.43</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>101</i>	<i>81 - 120</i>			

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

Batch ID: R329539		Instrument: VOA2		Method: SW8260						
<b>LCS</b>	Sample ID: <b>VLCSW-181218</b>	Units: <b>ug/L</b>			Analysis Date: <b>18-Dec-2018 22:40</b>					
Client ID:	Run ID: <b>VOA2_329539</b>	SeqNo: <b>4872222</b>		PrepDate:			DF: <b>1</b>			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	20.19	1.0	20	0	101	70 - 130				
1,1,2-Trichloroethane	19.93	1.0	20	0	99.7	77 - 113				
1,1-Dichloroethane	19.95	1.0	20	0	99.7	71 - 122				
1,1-Dichloroethene	21.81	1.0	20	0	109	70 - 130				
1,2-Dichloroethane	16.91	1.0	20	0	84.5	70 - 124				
Acetone	40.97	2.0	40	0	102	70 - 130				
Benzene	20.55	1.0	20	0	103	74 - 120				
Carbon disulfide	41.48	2.0	40	0	104	70 - 130				
Chloroform	19.51	1.0	20	0	97.6	71 - 121				
cis-1,2-Dichloroethene	20.31	1.0	20	0	102	75 - 122				
Ethylbenzene	20.26	1.0	20	0	101	77 - 117				
Methylene chloride	21.88	2.0	20	0	109	70 - 127				
Tetrachloroethene	20.25	1.0	20	0	101	76 - 119				
Toluene	20.51	1.0	20	0	103	77 - 118				
trans-1,2-Dichloroethene	20.85	1.0	20	0	104	72 - 127				
Trichloroethene	21.06	1.0	20	0	105	77 - 121				
Vinyl chloride	24.03	1.0	20	0	120	70 - 130				
Xylenes, Total	60.57	1.0	60	0	101	75 - 122				
1,2-Dichloroethene, Total	41.16	1.0	40	0	103	72 - 127				
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>46.61</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>93.2</i>	<i>70 - 130</i>				
<i>Surr: 4-Bromofluorobenzene</i>	<i>49.37</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>98.7</i>	<i>82 - 115</i>				
<i>Surr: Dibromofluoromethane</i>	<i>48.25</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>96.5</i>	<i>73 - 126</i>				
<i>Surr: Toluene-d8</i>	<i>48.9</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.8</i>	<i>81 - 120</i>				

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

Batch ID: R329539		Instrument: VOA2		Method: SW8260						
<b>MS</b>	Sample ID: <b>HS18120506-03MS</b>	Units: <b>ug/L</b>			Analysis Date: <b>19-Dec-2018 01:53</b>					
Client ID:	Run ID: <b>VOA2_329539</b>	SeqNo: <b>4872229</b>		PrepDate:		DF: <b>1</b>				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	18.79	1.0	20	0	94.0	70 - 130				
1,1,2-Trichloroethane	17.21	1.0	20	0	86.1	70 - 117				
1,1-Dichloroethane	17.96	1.0	20	0	89.8	70 - 127				
1,1-Dichloroethene	19.85	1.0	20	0	99.3	70 - 130				
1,2-Dichloroethane	15.69	1.0	20	0	78.4	70 - 127				
Acetone	35.1	2.0	40	3.456	79.1	70 - 130				
Benzene	18.52	1.0	20	0	92.6	70 - 127				
Carbon disulfide	36.14	2.0	40	0	90.3	70 - 130				
Chloroform	18.28	1.0	20	0.8952	86.9	70 - 125				
cis-1,2-Dichloroethene	18.21	1.0	20	0	91.0	70 - 128				
Ethylbenzene	18.27	1.0	20	0	91.3	70 - 124				
Methylene chloride	18.63	2.0	20	0	93.2	70 - 128				
Tetrachloroethene	18.65	1.0	20	0	93.2	70 - 130				
Toluene	18.35	1.0	20	0	91.7	70 - 123				
trans-1,2-Dichloroethene	19.23	1.0	20	0	96.1	70 - 130				
Trichloroethene	18.66	1.0	20	0	93.3	70 - 129				
Vinyl chloride	19.24	1.0	20	0	96.2	70 - 130				
Xylenes, Total	54.16	1.0	60	0	90.3	70 - 130				
1,2-Dichloroethene, Total	37.44	1.0	40	0	93.6	70 - 130				
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>46.52</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>93.0</i>	<i>70 - 126</i>				
<i>Surr: 4-Bromofluorobenzene</i>	<i>48.78</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.6</i>	<i>81 - 113</i>				
<i>Surr: Dibromofluoromethane</i>	<i>49.29</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>98.6</i>	<i>77 - 123</i>				
<i>Surr: Toluene-d8</i>	<i>48.78</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.6</i>	<i>82 - 127</i>				

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

**Batch ID:** R329539      **Instrument:** VOA2      **Method:** SW8260

<b>MSD</b>		Sample ID: <b>HS18120506-03MSD</b>			Units: <b>ug/L</b>		Analysis Date: <b>19-Dec-2018 02:17</b>			
Client ID:		Run ID: <b>VOA2_329539</b>			SeqNo: <b>4872230</b>		PrepDate:		DF: <b>1</b>	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	18.48	1.0	20	0	92.4	70 - 130	18.79	1.7	20	
1,1,2-Trichloroethane	16.93	1.0	20	0	84.7	70 - 117	17.21	1.63	20	
1,1-Dichloroethane	17.76	1.0	20	0	88.8	70 - 127	17.96	1.15	20	
1,1-Dichloroethene	20.16	1.0	20	0	101	70 - 130	19.85	1.55	20	
1,2-Dichloroethane	15.21	1.0	20	0	76.0	70 - 127	15.69	3.1	20	
Acetone	35.58	2.0	40	3.456	80.3	70 - 130	35.1	1.34	20	
Benzene	18.11	1.0	20	0	90.5	70 - 127	18.52	2.22	20	
Carbon disulfide	36.26	2.0	40	0	90.7	70 - 130	36.14	0.353	20	
Chloroform	18.21	1.0	20	0.8952	86.6	70 - 125	18.28	0.404	20	
cis-1,2-Dichloroethene	18.29	1.0	20	0	91.4	70 - 128	18.21	0.43	20	
Ethylbenzene	18.29	1.0	20	0	91.5	70 - 124	18.27	0.14	20	
Methylene chloride	18.72	2.0	20	0	93.6	70 - 128	18.63	0.501	20	
Tetrachloroethene	18.42	1.0	20	0	92.1	70 - 130	18.65	1.22	20	
Toluene	18.16	1.0	20	0	90.8	70 - 123	18.35	1.01	20	
trans-1,2-Dichloroethene	18.9	1.0	20	0	94.5	70 - 130	19.23	1.71	20	
Trichloroethene	18.69	1.0	20	0	93.5	70 - 129	18.66	0.192	20	
Vinyl chloride	18.72	1.0	20	0	93.6	70 - 130	19.24	2.74	20	
Xylenes, Total	53.83	1.0	60	0	89.7	70 - 130	54.16	0.611	20	
1,2-Dichloroethene, Total	37.19	1.0	40	0	93.0	70 - 130	37.44	0.664	20	
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>45.2</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>90.4</i>	<i>70 - 126</i>	<i>46.52</i>	<i>2.88</i>	<i>20</i>	
<i>Surr: 4-Bromofluorobenzene</i>	<i>48.9</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.8</i>	<i>81 - 113</i>	<i>48.78</i>	<i>0.244</i>	<i>20</i>	
<i>Surr: Dibromofluoromethane</i>	<i>49.43</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>98.9</i>	<i>77 - 123</i>	<i>49.29</i>	<i>0.287</i>	<i>20</i>	
<i>Surr: Toluene-d8</i>	<i>48.81</i>	<i>1.0</i>	<i>50</i>	<i>0</i>	<i>97.6</i>	<i>82 - 127</i>	<i>48.78</i>	<i>0.053</i>	<i>20</i>	

The following samples were analyzed in this batch: HS18120372-01      HS18120372-02      HS18120372-03

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

Batch ID: R328901		Instrument: ICS2100		Method: E300						
<b>MBLK</b>	Sample ID: <b>WBLKW1-120718</b>	Units: <b>mg/L</b>		Analysis Date: <b>07-Dec-2018 11:37</b>						
Client ID:	Run ID: <b>ICS2100_328901</b>	SeqNo: <b>4856524</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	ND	0.100								
Nitrogen, Nitrite (As N)	ND	0.100								
Sulfate	ND	0.500								
<b>LCS</b>	Sample ID: <b>WLCSW1-120718</b>	Units: <b>mg/L</b>		Analysis Date: <b>07-Dec-2018 11:51</b>						
Client ID:	Run ID: <b>ICS2100_328901</b>	SeqNo: <b>4856525</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	3.857	0.100	4	0	96.4	90 - 110				
Nitrogen, Nitrite (As N)	4.206	0.100	4	0	105	90 - 110				
Sulfate	19.03	0.500	20	0	95.1	90 - 110				
<b>LCSD</b>	Sample ID: <b>WLCSDW1-120718</b>	Units: <b>mg/L</b>		Analysis Date: <b>07-Dec-2018 12:06</b>						
Client ID:	Run ID: <b>ICS2100_328901</b>	SeqNo: <b>4856526</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	3.945	0.100	4	0	98.6	90 - 110	3.857	2.26	20	
Nitrogen, Nitrite (As N)	4.294	0.100	4	0	107	90 - 110	4.206	2.07	20	
Sulfate	19.46	0.500	20	0	97.3	90 - 110	19.03	2.24	20	
<b>MS</b>	Sample ID: <b>HS18120398-06MS</b>	Units: <b>mg/L</b>		Analysis Date: <b>07-Dec-2018 18:02</b>						
Client ID:	Run ID: <b>ICS2100_328901</b>	SeqNo: <b>4856549</b>	PrepDate:	DF: <b>1</b>						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	3.013	0.100	2	0.899	106	80 - 120				
Nitrogen, Nitrite (As N)	2.333	0.100	2	0.225	105	80 - 120				
Sulfate	1371	0.500	10	1400	-290	80 - 120				SEO

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

<b>Batch ID:</b> R328901	<b>Instrument:</b> ICS2100	<b>Method:</b> E300
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<b>MS</b>	Sample ID: <b>HS18111124-12MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>07-Dec-2018 14:58</b>							
Client ID:	Run ID: <b>ICS2100_328901</b>	SeqNo: <b>4856537</b>	PrepDate: <b>DF: 500</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	883.8	50.0	1000	0	88.4	80 - 120				
Nitrogen, Nitrite (As N)	993.8	50.0	1000	0	99.4	80 - 120				
Sulfate	4403	250	5000	83.95	86.4	80 - 120				

<b>MSD</b>	Sample ID: <b>HS18120398-06MSD</b>	Units: <b>mg/L</b>	Analysis Date: <b>07-Dec-2018 18:17</b>							
Client ID:	Run ID: <b>ICS2100_328901</b>	SeqNo: <b>4856550</b>	PrepDate: <b>DF: 1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	3.183	0.100	2	0.899	114	80 - 120	3.013	5.49	20	
Nitrogen, Nitrite (As N)	2.363	0.100	2	0.225	107	80 - 120	2.333	1.28	20	
Sulfate	1380	0.500	10	1400	-201	80 - 120	1371	0.649	20	SEO

<b>MSD</b>	Sample ID: <b>HS18111124-12MSD</b>	Units: <b>mg/L</b>	Analysis Date: <b>07-Dec-2018 15:13</b>							
Client ID:	Run ID: <b>ICS2100_328901</b>	SeqNo: <b>4856538</b>	PrepDate: <b>DF: 500</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual
Nitrogen, Nitrate (As N)	901.4	50.0	1000	0	90.1	80 - 120	883.8	1.97	20	
Nitrogen, Nitrite (As N)	1016	50.0	1000	0	102	80 - 120	993.8	2.25	20	
Sulfate	4523	250	5000	83.95	88.8	80 - 120	4403	2.67	20	

The following samples were analyzed in this batch: HS18120372-01      HS18120372-02

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

<b>Batch ID:</b> R329295	<b>Instrument:</b> WetChem_HS	<b>Method:</b> SM4500 S2-F
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<b>MBLK</b>	Sample ID: <b>MBLK-R329295</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866075</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide ND 1.00

<b>LCS</b>	Sample ID: <b>LCS-R329295</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866074</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide 21.84 1.00 25 0 87.4 85 - 115

<b>LCSD</b>	Sample ID: <b>LCSD-R329295</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866073</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide 21.64 1.00 25 0 86.6 85 - 115 21.84 0.92 20

<b>MS</b>	Sample ID: <b>HS18120251-07MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>11-Dec-2018 17:00</b>							
Client ID:	Run ID: <b>WetChem_HS_329295</b>	SeqNo: <b>4866076</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Sulfide 23.84 1.00 25 0.24 94.4 80 - 120

The following samples were analyzed in this batch: HS18120372-01 HS18120372-02

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QC BATCH REPORT**

<b>Batch ID:</b> R329406	<b>Instrument:</b> TOC_02	<b>Method:</b> SW9060
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<b>MBLK</b>	Sample ID: <b>WBLKW1-121718</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 13:49</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868986</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total                      ND                      1.00

<b>LCS</b>	Sample ID: <b>WLCSW1-121718</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 14:04</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868987</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total                      9.777                      1.00                      10                      0                      97.8                      85 - 115

<b>LCSD</b>	Sample ID: <b>WLCSDW1-121718</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 14:20</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868988</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total                      9.752                      1.00                      10                      0                      97.5                      85 - 115                      9.777                      0.256                      20

<b>MS</b>	Sample ID: <b>HS18120372-01MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 14:52</b>							
Client ID: <b>33MW16S / GW01</b>	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4868990</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total                      11.72                      1.00                      10                      2.435                      92.8                      80 - 120

<b>MS</b>	Sample ID: <b>HS18120251-07MS</b>	Units: <b>mg/L</b>	Analysis Date: <b>17-Dec-2018 18:52</b>							
Client ID:	Run ID: <b>TOC_02_329406</b>	SeqNo: <b>4870394</b>	PrepDate: DF: <b>1</b>							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit	Qual

Organic Carbon, Total                      14.28                      1.00                      10                      4.442                      98.4                      80 - 120

The following samples were analyzed in this batch: 

HS18120372-01	HS18120372-02
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**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**WorkOrder:** HS18120372

**QUALIFIERS,  
ACRONYMS, UNITS**

<b>Qualifier</b>	<b>Description</b>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

<b>Acronym</b>	<b>Description</b>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

---

---

**CERTIFICATIONS,ACCREDITATIONS & LICENSES**

<b>Agency</b>	<b>Number</b>	<b>Expire Date</b>
North Carolina	624-2018	31-Dec-2018
Arkansas	88-0356	27-Mar-2019
Texas	T10470231-18-21	30-Apr-2019
North Dakota	R193 2018-2019	30-Apr-2019
Illinois	004438	29-Jun-2019
Louisiana	03087	30-Jun-2019
Dept of Defense	ANAB L2231	22-Dec-2018
Kentucky	123043 - 2018	30-Apr-2019
Kansas	E-10352 2018-2019	31-Jul-2019
Oklahoma	2018-156	31-Aug-2019

**Client:** Burns & McDonnell  
**Project:** SWMU 33 LTM Groundwater  
**Work Order:** HS18120372

**SAMPLE TRACKING**

---

Lab Samp ID	Client Sample ID	Action	Date	Person	New Location
HS18120372-01	33MW16S / GW01	Login	12/7/2018 11:54:55 AM	NDR	WET249
HS18120372-01	33MW16S / GW01	Login	12/7/2018 11:54:55 AM	NDR	WET249
HS18120372-01	33MW16S / GW01	Login	12/7/2018 11:54:55 AM	NDR	MET081
HS18120372-01	33MW16S / GW01	Login	12/7/2018 11:54:55 AM	NDR	VOA095
HS18120372-01	33MW16S / GW01	Login	12/7/2018 11:54:55 AM	NDR	RSK015
HS18120372-01	33MW16S / GW01	Login	12/7/2018 11:54:55 AM	NDR	WET249
HS18120372-02	33MW16D / GW01	Login	12/7/2018 11:54:55 AM	NDR	WET249
HS18120372-02	33MW16D / GW01	Login	12/7/2018 11:54:55 AM	NDR	WET249
HS18120372-02	33MW16D / GW01	Login	12/7/2018 11:54:55 AM	NDR	MET081
HS18120372-02	33MW16D / GW01	Login	12/7/2018 11:54:55 AM	NDR	VOA095
HS18120372-02	33MW16D / GW01	Login	12/7/2018 11:54:55 AM	NDR	RSK015
HS18120372-02	33MW16D / GW01	Login	12/7/2018 11:54:55 AM	NDR	WET249
HS18120372-03	Trip Blank	Login	12/7/2018 11:54:55 AM	NDR	VOA095

---

Sample Receipt Checklist

Client Name: BurnsMcDonnell-KansasCity
Work Order: HS18120372

Date/Time Received: 07-Dec-2018 10:00
Received by: JRM

Checklist completed by: Nilesh D. Ranchod
eSignature Date 7-Dec-2018

Reviewed by: Corey Grandits
eSignature Date 7-Dec-2018

Matrices: Water

Carrier name: FedEx Priority Overnight

- Shipping container/cooler in good condition? Yes [checked] No [ ] Not Present [ ]
Custody seals intact on shipping container/cooler? Yes [ ] No [ ] Not Present [checked]
Custody seals intact on sample bottles? Yes [ ] No [ ] Not Present [checked]
Chain of custody present? Yes [checked] No [ ]
Chain of custody signed when relinquished and received? Yes [checked] No [ ]
Chain of custody agrees with sample labels? Yes [checked] No [ ]
Samples in proper container/bottle? Yes [checked] No [ ]
Sample containers intact? Yes [checked] No [ ]
TX1005 solids received in hermetically sealed vials? Yes [ ] No [ ] N/A [checked]
Sufficient sample volume for indicated test? Yes [checked] No [ ]
All samples received within holding time? Yes [checked] No [ ]
Container/Temp Blank temperature in compliance? Yes [checked] No [ ]

Temperature(s)/Thermometer(s): 2.8C /3.1C UC/C IR # 25
Cooler(s)/Kit(s): 44254
Date/Time sample(s) sent to storage: 12/07/2018 12:15

- Water - VOA vials have zero headspace? Yes [checked] No [ ] No VOA vials submitted [ ]
Water - pH acceptable upon receipt? Yes [checked] No [ ] N/A [ ]
pH adjusted? Yes [ ] No [checked] N/A [ ]
pH adjusted by:

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

Corrective Action:



Cincinnati, OH  
+1 513 733 5336

Fort Collins, CO  
+1 970 490 1511

Everett, WA  
+1 425 356 2600

Holland, MI  
+1 616 399 6070

# Chain of Custody Form

## HS18120372

, WV

Page \_\_\_\_ of \_\_\_\_

COC ID: 171055

Burns & McDonnell  
SWMU 33 LTM Groundwater

ALS Project Manager:



Customer Information		Project Information	
Purchase Order	Need	Project Name	SWMU 33 LTM Groundwater
Work Order		Project Number	
Company Name	Burns & McDonnell	Bill To Company	Burns & McDonnell
Send Report To	Sharon Shelton	Invoice Attn	Accounts Payable
Address	9400 Ward Parkway	Address	9400 Ward Parkway
City/State/Zip	Kansas City, MO 64114	City/State/Zip	Kansas City MO 64114
Phone	(816) 822-3900	Phone	(816) 822-3900
Fax		Fax	
e-Mail Address	sshelton@burnsmcd.com	e-Mail Address	supplierinvoices@burnsmcd.com

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	33MW16S/GW01	12/5/2018	1410	GW		11	X	X	X	X	X	X					
2	33MW16D/GW01	12/5/2018	1515	GW		11	X	X	X	X	X	X					
3	TRIP BLANK	1 -	-	W		2	X										
4																	
5	<i>Club B</i>																
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign <i>CHRIS BAUGENBUSH</i> <i>Club B</i>		Shipment Method		Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> STD 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour				Results Due Date:			
Relinquished by: <i>Club B</i>	Date: 12/5/2018	Time: 1730	Received by:	Notes: BM LTM Groundwater						QC Package: (Check One Box Below)	
Relinquished by:	Date: 12/7/18	Time: 10:00	Received by (Laboratory): <i>S. MAJUMDAR</i>	Cooler ID: 44254	Cooler Temp.: 2.8	<input type="checkbox"/> Level II Std. CC		<input type="checkbox"/> TRRP CheckList			
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):		<i>CF03</i>	<input checked="" type="checkbox"/> Level III Std. OIG/Raw Date		<input type="checkbox"/> TRRP Level IV			
Preservative Key: 1-HCl 2-HNO <sub>3</sub> 3-H <sub>2</sub> SO <sub>4</sub> 4-NaOH 5-Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> 6-NaHSO <sub>4</sub> 7-Other 8-4°C 9-5035						<input type="checkbox"/> Level IV SW846/CLP		<input type="checkbox"/> Other			

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.  
 2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.  
 3. The Chain of Custody is a legal document. All information must be completed accurately.

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 **ALS**  
10450 Stanciff Rd., Suite 210  
Houston, Texas 77099  
Tel. +1 281 530 5656  
Fax. +1 281 530 5887

CUSTODY SEAL	
Date: 12/6/2010	Time: 11:50
Name: Willie Brown	
Company: Brown & McDaniel	
Seal Broken	
Date:	

**FedEx**  
TRK#  
0221 4380 9534 2374

**THU - 06 DEC 10:30A**  
**PRIORITY OVERNIGHT**

**NH SGRA**

**77099**  
TX-US **IAH**

**APPENDIX C**  
**Data Validation Report for 4<sup>th</sup> Quarter 2018 Sampling Event**

# Memorandum



Date: January 3, 2019  
To: File  
From: Sharon Shelton  
Re: Quality Assurance/Quality Control (QA/QC) Review of Analytical Data  
Former AK Steel – Kansas City Facility / EPA ID MOD 007 118 029  
Long Term Monitoring Program  
Ross Custom Properties (Burns & McDonnell Project No. 106603)

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Groundwater and associated quality control (QC) samples were collected at the Former AK Steel Facility in Kansas City, Missouri on December 4 and 5, 2018 as outlined on Table 1. The samples were analyzed by ALS Environmental of Houston, Texas and reported in the following data sets:

Lab	Lab Report	Date Collected	Matrix
ALS Environmental	HS18120251	12/4/2018	Ground water
	HS18120266	12/5/2018	
	HS18120372	12/5/2018	

The QA/QC results in association with the ground water were examined for any method-specific requirements. Data qualifiers, when appropriate, were added to the data in general accordance with United States Environmental Protection Agency's (USEPA's) *National Functional Guidelines for Inorganic Superfund Data Review* (NFGI, 2017) and *National Functional Guidelines for Organic Superfund Methods Data Review* (NFGO, 2017) and as outlined in the *Long Term Monitoring Plan, SWMU 33 – Nail Mill Degreasing Area, Former AK Steel Kansas City Facility* (Burns & McDonnell, 2018). The QA/QC review results are discussed below. Table 2 presents a data summary and data qualifiers that were added as a result of this data review.

- Chain-of-Custody (COC) – The COCs were appropriately completed.
- Requested Analyses Completed – All analyses were completed as requested on the COC forms. Monitoring Wells 33MW10S and 33MW10D were covered by rubble and debris and could not be accessed for sampling. Monitoring Wells 33MW16S and 33MW16D were sampled instead. Monitoring Well 33MW9S was destroyed at some point since the last sampling event in 2015 and is no longer able to be sampled.
- Holding Times – Samples were analyzed within the recommended method holding times, with the following exceptions:
  - Anions (nitrate and nitrite): The nitrate or nitrite analyses listed below were received by ALS Environmental with limited holding time remaining. Analyses were performed outside of the 48-hour holding time, but within 8 hours of holding time expiration. Results for these samples and analyses were qualified as estimated, potentially biased low (J- flag for detections, UJ flag for for non-detects) due to the holding time exceedance.

33MW5D/GW01  
33MW5I/GW01

33MW5S/GW01  
33MW5-1000/GW01 DUP

## Memorandum (continued)



January 3, 2019

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4. Sample Preservation – The samples were received by the lab below or within the 4 degrees Celsius ( $^{\circ}\text{C}$ )  $\pm 2^{\circ}\text{C}$  sample preservation temperature range. None of the samples were frozen, and they are considered viable. All samples were stored by the lab at the appropriate temperature. No qualifiers were required.
5. Method Requirements – Eurofins flagged any detection between the method detection limit (MDL) and the method limit of quantitation (LOQ) with a “J” to indicate the reported value was estimated. Any detection reported with this “J” qualifier should be used as reported by the lab, unless otherwise noted during this QA/QC evaluation.
6. Laboratory Method Blanks – Method blanks were reviewed to determine the potential for sample cross contamination due to handling within the laboratory. No detections were noted in the method blanks and cross contamination at the laboratory was not a concern.
7. Rinsate Blank – An equipment rinsate blank was collected from sampling pump and tubing following the sampling on Monitoring Well 33MW5I. The following detections of target analytes were noted:
  - **33MW5I/RW01:**

Ethylene – 1.73 ug/L	Methane - 3.56 ug/L	Sulfide – 1.36 mg/L
----------------------	---------------------	---------------------

The following samples were collected after the rinsate blank and exhibited concentrations less than five times (5X) the rinsate blank concentration. These results were disregarded as false positive (U flag):

  - **Ethylene:** 33MW5S/GW01, 33MW7S/GW01, 33MW8S/GW01, 33MW8-1000/GW01 DUP, 33MW11D/GW01, and 33MW16S/GW01
  - **Methane:** 33MW5S/GW01, 33MW6D/GW01, 33MW7S/GW01, 33MW8S/GW01, 33MW8-1000/GW01 DUP, 33MW11S/GW01, and 33MW16S/GW01
  - **Sulfide:** 33MW5D/GW01, 33MW5I/GW01, 33MW6D/GW01, 33MW7S/GW01, 33MW8S/GW01, 33MW8-1000/GW01 DUP, 33MW11D/GW01, 33MW11S/GW01, and 33MW16D/GW01
8. Trip Blank – Trip blanks are sample containers filled with reagent water and shipped with field samples to evaluate potential VOC cross-contamination during sample collection, shipment, and storage. A trip blank was submitted with each day’s cooler. No detections were noted in the trip blanks.
9. Surrogates – Surrogates are added for organic analyses. Surrogates are compounds not normally found in the environment that are added (spiked) into samples and analyzed for percent recovery (REC). The laboratory sets maximum and minimum limits on the REC for the method used. All surrogate RECs were within control limits:

January 3, 2019

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10. Laboratory Control Samples/Lab Control Sample Duplicate (LCS/LCSD) – The LCS contains a matrix similar to that of the sample that has been spiked with known concentrations of target analytes. The LCS is prepared and analyzed by the same method as the samples. As a measure of analytical accuracy, the results of the LCS are compared against the known analyte concentrations in the spike to determine REC. The purpose of the LCS is to determine the performance of the laboratory with respect to analyte recovery, independent of field sample matrix interference. A laboratory control sample duplicate LCSD is a duplicate sample of the LCS. The difference between the LCS and LCSD RECs is calculated to evaluate precision and is reported as the relative percent difference (RPD). With the exception noted below, LCS/LCSD RECs and/or RPDs were within their respective QC limits.
  - **Anions (EPA 300) Batch R329319:** LCSD REC of nitrite was slightly above the 110 percent QC maximum at 111 percent. LCS REC was acceptable. Nitrite was not detected in the associated samples. Qualification was not required.
  
11. Matrix Spike/Matrix Spike Duplicates (MS/MSD) – MS/MSDs are typically run for organic and inorganic analyses. A sample is split into three portions (original, MS and MSD), and a known amount of a target analyte is added (spiked) to two portions (MS and MSD) of the sample. The results of these two portions are compared with each other for reproducibility using the RPD. They are also compared against the unspiked portion of the sample for REC of the spike. The laboratory selected project-specific samples to use as MS/MSDs. The following observations were noted for the site-specific MS/MSDs:
  - **33MW5S/GW01:** 33MW5S/GW01 was used for MS/MSD analysis of VOCs in QC Batch R329441. No outliers were noted.
  - **33MW7D/GW01:** 33MW7D/GW01 was used for the MS analysis of sulfide (QC Batch R329295) and total organic carbon (QC Batch R329406). No outliers were noted.
  - **33MW11S/GW01:** 33MW11S/GW01 was used for the MS/MSD analysis of manganese (QC Batch 135642) and anions (QC Batch R328810). The spike amounts manganese was less than one-fourth of the parent sample concentration. As such, no conclusion regarding the accuracy or precision of the MS/MSD for manganese could be made. No qualifiers were required. No outliers were noted for the anions MS/MSD.
  - **33MW16S/GW01:** 33MW16S/GW01 was used for the MS analysis of total organic carbon in QC Batch R329406. No other outlier was noted.
  
12. Field Duplicate Results – Field duplicate results provide information on the ability to reproduce field results and account for error introduced from sample inhomogeneity, handling, shipping, storage, preparation, and analysis of field samples. There are no specific USEPA criteria for qualifying data from field duplicate results. Depending upon the sample concentration, one of the following criteria is applicable:

January 3, 2019

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- Is the compound detected in both portions?
- If the sample concentrations are greater than 5 times the detection limit, then the maximum allowable RPD is 20 percent for water samples.
- If the sample concentrations are less than 5 times the detection limit, then a sensitivity test is applied. For the sensitivity test, the sample concentrations must agree within  $\pm$  one times the lower detection limit for water samples.

The following field duplicate pairs were collected:

- 33MW5I/GW01 and 33MW5-1000/GW01 DUP
- 33MW8S/GW01 and 33MW8-1000/GW01 DUP

Comparison of field duplicate results is provided on Table 3. The ethane and ethylene results were not adequately replicated in duplicate pair 33MW5I/GW01 and 33MW5-1000/GW01Dup. As such, these results were qualified as estimated (J flag for detections and UJ for non-detects) due to field duplicate discrepancies.

13. Detection and Quantitation Limits – As noted on Table 2, dilutions were required for one or more samples. These dilutions were required to bring target analyte concentrations into the linearity range of the instrument calibration and/or to compensate for matrix interference. Reporting limits were adjusted accordingly. No data qualifiers were added based on the dilutions.
14. Initial and Continuing Calibration Verifications – Initial calibration verifications (ICVs) are used to evaluate the accuracy of the initial calibration standards prior to analysis of samples. Continuing Calibration Verifications (CCVs) are used to determine whether the instrument was within acceptable calibration during the period in which samples were analyzed. With the following exceptions, no issues were noted with the ICVs or CCVs:
  - Nitrite: Elevated CCVs were noted for nitrite in QC Batches R328810, R329319, and R329320. Since associated nitrite results were non-detect, high bias was not a concern and data qualification were not required.
15. Case Narrative – No additional QC outliers were noted by the laboratory in the Case Narratives.
16. Conclusion – The data were reviewed for achievement of any method-specified QA/QC criteria. Table 2 presents a data summary and data qualifiers that were added during this review. The data are valid (as qualified) to use in reporting the results of this investigation.

### Attachments

Table 1: Sample Collection Summary

Table 2: Data Summary and Qualification

Table 3: Field Duplicate Results

**Table 1**  
**Sample Collection Summary**  
*SWMU 33 Long Term Monitoring Program*  
*Former AK Steel Kansas City Facility*

Well No.	Sample ID	Date Sampled	Comment	Data Package	Lab ID	VOCs	MNA Parameters						
							MEE	Manganese	TOC	Nitrate as N	Nitrite as N	Sulfate	Sulfide
33MW5S	33MW5S / GW01	12/4/2018		HS18120251	HS18120251-03	X	X	X	X	X	X	X	X
33MW5I	33MW5I / GW01	12/4/2018		HS18120251	HS18120251-01	X	X	X	X	X	X	X	X
33MW5D	33MW5D / GW01	12/4/2018		HS18120251	HS18120251-05	X	X	X	X	X	X	X	X
33MW6D	33MW6D / GW01	12/5/2018		HS18120266	HS18120266-05	X	X	X	X	X	X	X	X
33MW7S	33MW7S / GW01	12/4/2018		HS18120251	HS18120251-06	X	X	X	X	X	X	X	X
33MW7D	33MW7D / GW01	12/4/2018		HS18120251	HS18120251-07	X	X	X	X	X	X	X	X
33MW8S	33MW8S / GW01	12/5/2018		HS18120266	HS18120266-03	X	X	X	X	X	X	X	X
33MW9S	Well destroyed. Unable to sample.												
33MW10S	Flush-mount well covered by rubble and debris. Unable to sample.												
33MW10D	Flush-mount well covered by rubble and debris. Unable to sample.												
33MW11S	33MW11S / GW01	12/5/2018		HS18120266	HS18120266-01	X	X	X	X	X	X	X	X
33MW11D	33MW11D / GW01	12/5/2018		HS18120266	HS18120266-02	X	X	X	X	X	X	X	X
33MW16S	33MW16S / GW01	12/5/2018	Sampled in lieu of 33MW10S	HS18120372	HS18120372-01	X	X	X	X	X	X	X	X
33MW16D	33MW16D / GW01	12/5/2018	Sampled in lieu of 33MW10D	HS18120372	HS18120372-02	X	X	X	X	X	X	X	X
QC	33MW5-1000 / GW01 "Dup"	12/4/2018	33MW5I / GW01 Duplicate	HS18120251	HS18120251-02	X	X	X	X	X	X	X	X
QC	33MW8-1000 / GW01 "DUP"	12/5/2018	33MW8S / GW01 Duplicate	HS18120266	HS18120266-04	X	X	X	X	X	X	X	X
QC	33MW05I / RW01	12/4/2018	Equipment Rinsate Blank	HS18120251	HS18120251-04	X	X	X	X	X	X	X	X
QC	Trip Blank	12/4/2018	Trip Blank	HS18120251	HS18120251-08	X							
QC	Trip Blank_20181205	12/5/2018	Trip Blank	HS18120266	HS18120266-06	X							
QC	Trip Blank_20181205B	12/5/2018	Trip Blank	HS18120372	HS18120372-03	X							

ID - Identification  
QC - Quality Control  
MEE - Methane, Ethane, and Ethene  
MNA - Monitored Natural Attenuation  
as N - "as nitrogen"  
TOC - Total Organic Carbon

**Table 2**  
**Data Summary and Qualification**  
**SWMU 33 Long Term Monitoring Program**  
**Former AK Steel Kansas City Facility**

Lab ID	Sample	Date	Analysis	Dilution Factor	Compound	Units	Result	Lab Qualifier	Validation Qualifier	Reason for Qualifier	Final Qualifier	Prep Batch	Analysis Batch
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	EPA 300	1	Nitrogen, Nitrate	mg/L	0.111	H	J-	HT	J-		R328810
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	H	UJ	HT	UJ		R328810
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	EPA 300	1	Sulfate	mg/L	74.3						R328810
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	RSK SOP-175	100	Ethane	ug/L	100	U			U		R329493
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	RSK SOP-175	100	Ethylene	ug/L	100	U			U		R329493
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	RSK SOP-175	100	Methane	ug/L	1,560						R329493
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SM 4500-S2-F	1	Sulfide	mg/L	2.84		U	RB	U		R329295
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 6020	10	Manganese	mg/L	0.688					135559	
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329441
HS18120251-05	33MW5D / GW01	12/4/2018 14:35	SW-846 9060	1	Total Organic Carbon	mg/L	3.94						R329406
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	H	UJ	HT	UJ		R329319
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	H	UJ	HT	UJ		R329319
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	EPA 300	10	Sulfate	mg/L	256						R329653
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	RSK SOP-175	1	Ethane	ug/L	1.00	U	UJ	FDUP	UJ		R329493
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	RSK SOP-175	1	Ethylene	ug/L	17.5		J	FDUP	J		R329493
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	RSK SOP-175	100	Methane	ug/L	1,010						R329493
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SM 4500-S2-F	1	Sulfide	mg/L	1.64		U	RB	U		R329295
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 6020	100	Manganese	mg/L	9.71					135559	
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.7						R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	5	1,2-Dichloroethene	ug/L	380						R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329441

**Table 2**  
**Data Summary and Qualification**  
**SWMU 33 Long Term Monitoring Program**  
**Former AK Steel Kansas City Facility**

Lab ID	Sample	Date	Analysis	Dilution Factor	Compound	Units	Result	Lab Qualifier	Validation Qualifier	Reason for Qualifier	Final Qualifier	Prep Batch	Analysis Batch
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	5	cis-1,2-Dichloroethene	ug/L	370						R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	5	trans-1,2-Dichloroethene	ug/L	5.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Vinyl chloride	ug/L	140						R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329441
HS18120251-01	33MW5I / GW01	12/4/2018 10:15	SW-846 9060	1	Total Organic Carbon	mg/L	4.73						R329406
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	H	UJ	HT	UJ		R329320
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	H	UJ	HT	UJ		R329320
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	EPA 300	1	Sulfate	mg/L	61.3						R329320
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	RSK SOP-175	1	Ethane	ug/L	1.00	U			U		R329493
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	RSK SOP-175	1	Ethylene	ug/L	1.64		U	RB	U		R329493
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	RSK SOP-175	1	Methane	ug/L	15.5		U	RB	U		R329493
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SM 4500-S2-F	1	Sulfide	mg/L	1.00	U			U		R329295
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 6020	100	Manganese	mg/L	12.8					135559	
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	1,2-Dichloroethene	ug/L	6.4						R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	6.4						R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329441
HS18120251-03	33MW5S / GW01	12/4/2018 12:00	SW-846 9060	1	Total Organic Carbon	mg/L	5.32						R329406
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	U			U		R328810
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R328810
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	EPA 300	2	Sulfate	mg/L	105						R329653
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	RSK SOP-175	1	Ethane	ug/L	1.00	U			U		R329609
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	RSK SOP-175	1	Ethylene	ug/L	1.00	U			U		R329609
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	RSK SOP-175	1	Methane	ug/L	14.1		U	RB	U		R329609
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SM 4500-S2-F	1	Sulfide	mg/L	2.44		U	RB	U		R329295
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 6020	1	Manganese	mg/L	1.38					135642	

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Lab ID	Sample	Date	Analysis	Dilution Factor	Compound	Units	Result	Lab Qualifier	Validation Qualifier	Reason for Qualifier	Final Qualifier	Prep Batch	Analysis Batch
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329601
HS18120266-05	33MW6D / GW01	12/5/2018 13:05	SW-846 9060	1	Total Organic Carbon	mg/L	2.80						R329406
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	U			U		R329320
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R329320
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	EPA 300	1	Sulfate	mg/L	40.9						R329320
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	RSK SOP-175	200	Ethane	ug/L	371						R329493
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	RSK SOP-175	200	Ethylene	ug/L	200	U			U		R329493
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	RSK SOP-175	200	Methane	ug/L	996						R329493
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SM 4500-S2-F	1	Sulfide	mg/L	1.00	U			U		R329295
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 6020	10	Manganese	mg/L	0.492					135559	
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329441

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HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329441
HS18120251-07	33MW7D / GW01	12/4/2018 16:45	SW-846 9060	1	Total Organic Carbon	mg/L	4.44						R329406
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	EPA 300	1	Nitrogen, Nitrate	mg/L	0.266						R329320
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R329320
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	EPA 300	1	Sulfate	mg/L	69.1						R329320
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	RSK SOP-175	1	Ethane	ug/L	1.00	U			U		R329493
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	RSK SOP-175	1	Ethylene	ug/L	1.66		U	RB	U		R329493
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	RSK SOP-175	1	Methane	ug/L	5.22		U	RB	U		R329493
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SM 4500-S2-F	1	Sulfide	mg/L	1.44		U	RB	U		R329295
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 6020	50	Manganese	mg/L	3.18					135559	
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329441
HS18120251-06	33MW7S / GW01	12/4/2018 15:50	SW-846 9060	1	Total Organic Carbon	mg/L	2.29						R329406
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	U			U		R328810
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R328810
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	EPA 300	10	Sulfate	mg/L	279						R329653
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	RSK SOP-175	1	Ethane	ug/L	1.00	U			U		R329609
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	RSK SOP-175	1	Ethylene	ug/L	1.36		U	RB	U		R329609
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	RSK SOP-175	1	Methane	ug/L	8.64		U	RB	U		R329609
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SM 4500-S2-F	1	Sulfide	mg/L	1.84		U	RB	U		R329295
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 6020	1	Manganese	mg/L	0.632					135642	
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	1,1-Dichloroethane	ug/L	9.5						R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	1,2-Dichloroethene	ug/L	79						R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329601

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Lab ID	Sample	Date	Analysis	Dilution Factor	Compound	Units	Result	Lab Qualifier	Validation Qualifier	Reason for Qualifier	Final Qualifier	Prep Batch	Analysis Batch
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	78						R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.6						R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Trichloroethene	ug/L	39						R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329601
HS18120266-03	33MW8S / GW01	12/5/2018 11:55	SW-846 9060	1	Total Organic Carbon	mg/L	2.60						R329406
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	U			U		R328810
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R328810
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	EPA 300	1	Sulfate	mg/L	12.9						R328810
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	RSK SOP-175	1	Ethane	ug/L	1.12						R329609
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	RSK SOP-175	1	Ethylene	ug/L	2.82		U	RB	U		R329609
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	RSK SOP-175	5	Methane	ug/L	103						R329609
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SM 4500-S2-F	1	Sulfide	mg/L	1.84		U	RB	U		R329295
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 6020	1	Manganese	mg/L	0.634					135642	
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Acetone	ug/L	3.0						R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329601
HS18120266-02	33MW11D / GW01	12/5/2018 10:45	SW-846 9060	1	Total Organic Carbon	mg/L	3.17						R329406
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	U			U		R328810
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R328810
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	EPA 300	1	Sulfate	mg/L	38.0						R328810
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	RSK SOP-175	1	Ethane	ug/L	1.00	U			U		R329609
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	RSK SOP-175	1	Ethylene	ug/L	1.00	U			U		R329609
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	RSK SOP-175	1	Methane	ug/L	9.66		U	RB	U		R329609

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Lab ID	Sample	Date	Analysis	Dilution Factor	Compound	Units	Result	Lab Qualifier	Validation Qualifier	Reason for Qualifier	Final Qualifier	Prep Batch	Analysis Batch
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SM 4500-S2-F	1	Sulfide	mg/L	2.24		U	RB	U		R329295
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 6020	1	Manganese	mg/L	0.944					135642	
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329601
HS18120266-01	33MW11S / GW01	12/5/2018 9:40	SW-846 9060	1	Total Organic Carbon	mg/L	7.76						R329406
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	U			U		R328901
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R328901
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	EPA 300	1	Sulfate	mg/L	0.500	U			U		R328901
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	RSK SOP-175	400	Ethane	ug/L	400	U			U		R329609
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	RSK SOP-175	400	Ethylene	ug/L	400	U			U		R329609
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	RSK SOP-175	400	Methane	ug/L	2,130						R329609
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SM 4500-S2-F	1	Sulfide	mg/L	1.64		U	RB	U		R329295
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 6020	10	Manganese	mg/L	0.560					135527	
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329539

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HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329539
HS18120372-02	33MW16D / GW01	12/5/2018 15:15	SW-846 9060	1	Total Organic Carbon	mg/L	2.32						R329406
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	EPA 300	1	Nitrogen, Nitrate	mg/L	0.114						R328901
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R328901
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	EPA 300	1	Sulfate	mg/L	21.5						R328901
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	RSK SOP-175	1	Ethane	ug/L	1.00	U			U		R329609
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	RSK SOP-175	1	Ethylene	ug/L	1.67		U	RB	U		R329609
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	RSK SOP-175	1	Methane	ug/L	6.32		U	RB	U		R329609
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SM 4500-S2-F	1	Sulfide	mg/L	1.00	U			U		R329295
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 6020	10	Manganese	mg/L	7.69					135527	
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329539
HS18120372-01	33MW16S / GW01	12/5/2018 14:10	SW-846 9060	1	Total Organic Carbon	mg/L	2.44						R329406
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	H	UJ	HT	UJ		R328810
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	H	UJ	HT	UJ		R328810
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	EPA 300	10	Sulfate	mg/L	272						R329653
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	RSK SOP-175	1	Ethane	ug/L	8.60		J	FDUP	J		R329493
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	RSK SOP-175	1	Ethylene	ug/L	1.00	U	UJ	FDUP	UJ		R329493
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	RSK SOP-175	100	Methane	ug/L	1,260						R329493
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SM 4500-S2-F	1	Sulfide	mg/L	1.00	U			U		R329295
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 6020	100	Manganese	mg/L	9.19					135559	
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.1						R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.8						R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	5	1,2-Dichloroethene	ug/L	440						R329441

**Table 2**  
**Data Summary and Qualification**  
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**Former AK Steel Kansas City Facility**

Lab ID	Sample	Date	Analysis	Dilution Factor	Compound	Units	Result	Lab Qualifier	Validation Qualifier	Reason for Qualifier	Final Qualifier	Prep Batch	Analysis Batch
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	5	cis-1,2-Dichloroethene	ug/L	430						R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	5	trans-1,2-Dichloroethene	ug/L	5.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Vinyl chloride	ug/L	130						R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329441
HS18120251-02	33MW5-1000 / GW01 "Dup"	12/4/2018	SW-846 9060	1	Total Organic Carbon	mg/L	4.86						R329406
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	U			U		R328810
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R328810
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	EPA 300	10	Sulfate	mg/L	280						R329653
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	RSK SOP-175	1	Ethane	ug/L	1.00	U			U		R329609
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	RSK SOP-175	1	Ethylene	ug/L	3.28		U	RB	U		R329609
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	RSK SOP-175	1	Methane	ug/L	6.72		U	RB	U		R329609
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SM 4500-S2-F	1	Sulfide	mg/L	1.24		U	RB	U		R329295
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 6020	1	Manganese	mg/L	0.623					135642	
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	1,1-Dichloroethane	ug/L	9.9						R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	1,2-Dichloroethene	ug/L	85						R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	83						R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.7						R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Trichloroethene	ug/L	42						R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329601
HS18120266-04	33MW8-1000 / GW01 "DUP"	12/5/2018	SW-846 9060	1	Total Organic Carbon	mg/L	2.62						R329406
HS18120251-04	33MW051 / RW01	12/4/2018 10:35	EPA 300	1	Nitrogen, Nitrate	mg/L	0.100	U			U		R329319
HS18120251-04	33MW051 / RW01	12/4/2018 10:35	EPA 300	1	Nitrogen, Nitrite	mg/L	0.100	U			U		R329319
HS18120251-04	33MW051 / RW01	12/4/2018 10:35	EPA 300	1	Sulfate	mg/L	0.500	U			U		R329319
HS18120251-04	33MW051 / RW01	12/4/2018 10:35	RSK SOP-175	1	Ethane	ug/L	1.00	U			U		R329493

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Lab ID	Sample	Date	Analysis	Dilution Factor	Compound	Units	Result	Lab Qualifier	Validation Qualifier	Reason for Qualifier	Final Qualifier	Prep Batch	Analysis Batch
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	RSK SOP-175	1	Ethylene	ug/L	1.73						R329493
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	RSK SOP-175	1	Methane	ug/L	3.56						R329493
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SM 4500-S2-F	1	Sulfide	mg/L	1.36						R329295
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 6020	1	Manganese	mg/L	0.00500	U			U	135559	
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329441
HS18120251-04	33MW05I / RW01	12/4/2018 10:35	SW-846 9060	1	Total Organic Carbon	mg/L	1.00	U			U		R329406
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329441
HS18120251-08	Trip Blank	12/4/2018	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329441
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329601

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HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329601
HS18120266-06	Trip Blank_20181205	12/5/2018	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329601
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	1,1,1-Trichloroethane	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	1,1,2-Trichloroethane	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	1,1-Dichloroethane	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	1,1-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	1,2-Dichloroethane	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	1,2-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Acetone	ug/L	2.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Benzene	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Carbon disulfide	ug/L	2.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Chloroform	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	cis-1,2-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Ethylbenzene	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Methylene chloride	ug/L	2.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Tetrachloroethene	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Toluene	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	trans-1,2-Dichloroethene	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Trichloroethene	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Vinyl chloride	ug/L	1.0	U			U		R329539
HS18120372-03	Trip Blank_20181205B	12/5/2018	SW-846 8260	1	Xylenes, Total	ug/L	1.0	U			U		R329539

mg/L - milligrams per liter

ug/L - micrograms per liter

U - Not detected. Value is the reporting limit.

UJ - Not detected. Reporting limit is an estimated value.

H - Holding time exceeded.

J - Qualified as estimated.

J- - Qualified as estimated, potentially biased low.

FDUP - Field Duplicate not adequately replicated.

HT - Holding time exceedance.

RB - Rinsate blank contamination.

**Table 3**  
**Field Duplicate Results**  
*SWMU 33 Long Term Monitoring Program*  
*Former AK Steel Kansas City Facility*

Analysis	Parameter	Sample ID:	Units	33MW51 / GW01		33MW5-1000 / GW01 Dup		RPD (%)
		Lab ID:		HS18120251-01		HS18120251-02		
EPA 300	Nitrogen, Nitrate		mg/L	0.100	UJ	0.100	UJ	--
EPA 300	Nitrogen, Nitrite		mg/L	0.100	UJ	0.100	UJ	--
EPA 300	Sulfate		mg/L	256		272		6.1
RSK SOP-175	Ethane		ug/L	1.00	U	8.6		Dup Failure
RSK SOP-175	Ethylene		ug/L	17.5		1	U	Dup Failure
RSK SOP-175	Methane		ug/L	1,010		1260		22.0
SM 4500-S2-F	Sulfide		mg/L	1.64	U	1	U	--
SW-846 6020	Manganese		mg/L	9.71		9.19		5.5
SW-846 8260	1,1,1-Trichloroethane		ug/L	1.0	U	1.0	U	--
SW-846 8260	1,1,2-Trichloroethane		ug/L	1.0	U	1.0	U	--
SW-846 8260	1,1-Dichloroethane		ug/L	1.0	U	1.1		--
SW-846 8260	1,1-Dichloroethene		ug/L	1.7		1.8		--
SW-846 8260	1,2-Dichloroethane		ug/L	1.0	U	1.00	U	--
SW-846 8260	1,2-Dichloroethene		ug/L	380		440		14.6
SW-846 8260	Acetone		ug/L	2.0	U	2.0	U	--
SW-846 8260	Benzene		ug/L	1.0	U	1.0	U	--
SW-846 8260	Carbon disulfide		ug/L	2.0	U	2.0	U	--
SW-846 8260	Chloroform		ug/L	1.0	U	1.0	U	--
SW-846 8260	cis-1,2-Dichloroethene		ug/L	370		430		15.0
SW-846 8260	Ethylbenzene		ug/L	1.0	U	1.0	U	--
SW-846 8260	Methylene chloride		ug/L	2.0	U	2.0	U	--
SW-846 8260	Tetrachloroethene		ug/L	1.0	U	1.0	U	--
SW-846 8260	Toluene		ug/L	1.0	U	1.0	U	--
SW-846 8260	trans-1,2-Dichloroethene		ug/L	5.0	U	5.0	U	--
SW-846 8260	Trichloroethene		ug/L	1.0	U	1.0	U	--
SW-846 8260	Vinyl chloride		ug/L	140		130		7.4
SW-846 8260	Xylenes, Total		ug/L	1.0	U	1.0	U	--
SW-846 9060	Total Organic Carbon		mg/L	4.73		4.86		2.7

**Table 3**  
**Field Duplicate Results**  
*SWMU 33 Long Term Monitoring Program*  
*Former AK Steel Kansas City Facility*

Analysis	Parameter	Sample ID:	Units	33MW8S / GW01	33MW8-1000 / GW01 DUP	RPD (%)
		Lab ID:		HS18120266-03	HS18120266-04	
EPA 300	Nitrogen, Nitrate		mg/L	0.100 U	0.100 U	--
EPA 300	Nitrogen, Nitrite		mg/L	0.100 U	0.100 U	--
EPA 300	Sulfate		mg/L	279	280	0.4
RSK SOP-175	Ethane		ug/L	1.00 U	1.00 U	--
RSK SOP-175	Ethylene		ug/L	1.36 U	3.28 U	--
RSK SOP-175	Methane		ug/L	8.64 U	6.72 U	--
SM 4500-S2-F	Sulfide		mg/L	1.84 U	1.24 U	--
SW-846 6020	Manganese		mg/L	0.632	0.623	1.4
SW-846 8260	1,1,1-Trichloroethane		ug/L	1.0 U	1.000 U	--
SW-846 8260	1,1,2-Trichloroethane		ug/L	1.0 U	1.000 U	--
SW-846 8260	1,1-Dichloroethane		ug/L	9.5	9.9	4.1
SW-846 8260	1,1-Dichloroethene		ug/L	1.0 U	1.000 U	--
SW-846 8260	1,2-Dichloroethane		ug/L	1.0 U	1.000 U	--
SW-846 8260	1,2-Dichloroethene		ug/L	79	85	7.3
SW-846 8260	Acetone		ug/L	2.0 U	2.0 U	--
SW-846 8260	Benzene		ug/L	1.0 U	1.0 U	--
SW-846 8260	Carbon disulfide		ug/L	2.0 U	2.0 U	--
SW-846 8260	Chloroform		ug/L	1.0 U	1.0 U	--
SW-846 8260	cis-1,2-Dichloroethene		ug/L	78	83	6.2
SW-846 8260	Ethylbenzene		ug/L	1.0 U	1.0 U	--
SW-846 8260	Methylene chloride		ug/L	2.0 U	2.0 U	--
SW-846 8260	Tetrachloroethene		ug/L	1.0 U	1.0 U	--
SW-846 8260	Toluene		ug/L	1.0 U	1.0 U	--
SW-846 8260	trans-1,2-Dichloroethene		ug/L	1.6	1.7	--
SW-846 8260	Trichloroethene		ug/L	39	42	7.4
SW-846 8260	Vinyl chloride		ug/L	1.0 U	1.0 U	--
SW-846 8260	Xylenes, Total		ug/L	1.0 U	1.0 U	--
SW-846 9060	Total Organic Carbon		mg/L	2.60	2.62	0.8

Dup - duplicate

mg/L - milligrams per liter

ug/L - micrograms per liter

RPD - relative percent difference

U - Not detected. Value is the reporting limit.

UJ - Not detected. Reporting limit is an estimated value.

**APPENDIX D**  
**Groundwater VOC Results for All Events**

**Table D-1**  
**VOC Analytical Results - All Events**  
 SWMU 33 Long Term Monitoring Program

Sample Name	Well ID	Date	Analyte: Units:	1,1,1- Trichloro ethane	1,1,2- Trichloro ethane	1,1- Dichloro ethane	1,1- Dichloro ethene	1,2- Dichloro ethane	1,2- Dichloro ethene	Acetone	Benzene	Carbon disulfide	Chloroform	cis-1,2- Dichloro ethene	Ethyl benzene	Methylene chloride	Tetra chloro ethene
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>MCS for Groundwater</b>				<b>200</b>	<b>5</b>	<b>2.7</b>	<b>7</b>	<b>5</b>	<b>130</b>	<b>14,000</b>	<b>5</b>	<b>810</b>	<b>80</b>	<b>70</b>	<b>700</b>	<b>5</b>	<b>5</b>
33MW5D/GW1	33MW5D	5/30/1997		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW5D/GW2	33MW5D	7/16/1998		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW5D/GW4	33MW5D	9/26/2007		5 U	5 U	5 U	5 U	5 U	NA	10 U	<b>0.3 J</b>	5 U	5 U	5 U	<b>0.61 J</b>	5 U	5 U
33MW05D/GW05	33MW5D	7/2/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW05D/GW06	33MW5D	9/24/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW05D/GW07	33MW5D	12/18/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW05D/GW08	33MW5D	3/13/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	<b>9.1 J</b>	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW5D / GW01	33MW5D	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW5I/GW2	33MW5I	7/17/1998		5 U	5 U	<b>5.49</b>	<b>10.5</b>	5 U	NA	100 U	5 U	5 U	5 U	<b>1,150 D</b>	5 U	5 U	5 U
33MW5I/GW4	33MW5I	10/4/2007		25 U	25 U	25 U	25 U	25 U	NA	130 U	5 U	25 U	25 U	<b>560</b>	25 U	25 U	25 U
33MW05I/GW05	33MW5I	7/2/2014		20 U	20 U	20 U	20 U	20 U	NA	200 U	20 U	40 U	20 U	<b>530</b>	20 U	<b>14 J</b>	20 U
33MW05I/GW06	33MW5I	9/24/2014		10 U	10 U	10 U	<b>2.3 J</b>	10 U	NA	100 U	10 U	20 U	10 U	<b>480</b>	10 U	20 U	10 U
33MW05I/GW07	33MW5I	12/18/2014		20 U	20 U	20 U	20 U	20 U	NA	200 U	20 U	40 U	20 U	<b>450</b>	20 U	40 U	20 U
33MW05I/GW08	33MW5I	3/13/2015		20 U	20 U	20 U	20 U	20 U	NA	200 U	20 U	40 U	20 U	<b>560</b>	20 U	40 U	20 U
33MW5I / GW01	33MW5I	12/4/2018		1.0 U	1.0 U	1.0 U	<b>1.7</b>	1.0 U	<b>380</b>	2.0 U	1.0 U	2.0 U	1.0 U	<b>370</b>	1.0 U	2.0 U	1.0 U
33MW5-1000 / GW01 Dup	33MW5I	12/4/2018	Duplicate	1.0 U	1.0 U	<b>1.1</b>	<b>1.8</b>	1.0 U	<b>440</b>	2.0 U	1.0 U	2.0 U	1.0 U	<b>430</b>	1.0 U	2.0 U	1.0 U
33MW5S/GW1	33MW5S	5/12/1997		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	<b>403 D</b>	5 U	5 U	5 U
33MW5S/GW2	33MW5S	7/17/1998		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	<b>386 D</b>	5 U	5 U	5 U
33MW5S/GW2D	33MW5S	7/17/1998	Duplicate	5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	<b>350 D</b>	5 U	5 U	5 U
33MW5S/GW4	33MW5S	10/4/2007		5 U	5 U	5 U	5 U	5 U	NA	25 U	<b>0.26 J</b>	5 U	5 U	<b>53</b>	5 U	5 U	5 U
33MW5S/GW4D	33MW5S	10/4/2007	Duplicate	5 U	5 U	5 U	5 U	5 U	NA	25 U	<b>0.27 J</b>	5 U	5 U	<b>55</b>	5 U	5 U	5 U
33MW05S/GW05	33MW5S	7/2/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>16</b>	1.0 U	2.0 U	1.0 U
33MW05S/GW05D	33MW5S	7/2/2014	Duplicate	1.0 U	1.0 U	<b>0.22 J</b>	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>18</b>	1.0 U	2.0 U	1.0 U
33MW05S/GW06D	33MW5S	9/24/2014	Duplicate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>18</b>	1.0 U	2.0 U	1.0 U
33MW05S/GW06	33MW5S	9/24/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>16</b>	1.0 U	2.0 U	1.0 U
33MW05S/GW07D	33MW5S	12/18/2014	Duplicate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>13</b>	1.0 U	2.0 U	1.0 U
33MW05S/GW07	33MW5S	12/18/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>13</b>	1.0 U	2.0 U	1.0 U
33MW05S/GW08D	33MW5S	3/13/2015	Duplicate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>12</b>	1.0 U	2.0 U	1.0 U
33MW05S/GW08	33MW5S	3/13/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>12</b>	1.0 U	2.0 U	1.0 U
33MW5S / GW01	33MW5S	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	<b>6.4</b>	2.0 U	1.0 U	2.0 U	1.0 U	<b>6.4</b>	1.0 U	2.0 U	1.0 U
33MW6D/DW1	33MW6D	4/17/1997		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW6D/GW1	33MW6D	5/30/1997		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW6D/GW2	33MW6D	7/15/1998		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW6D/GW3	33MW6D	2/2/2001		1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U
33MW6D/GW4	33MW6D	10/1/2007		5 U	5 U	5 U	5 U	5 U	NA	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW06D/GW05	33MW6D	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW06D/GW06	33MW6D	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	<b>3.0 J</b>	1.0 U	2.0 U	1.0 U	<b>0.19 J</b>	1.0 U	2.0 U	1.0 U
33MW06D/GW07	33MW6D	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 JU	1.0 U	2.0 U	1.0 U
33MW06D/GW08	33MW6D	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW6D / GW01	33MW6D	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U

**Table D-1**  
**VOC Analytical Results - All Events**  
*SWMU 33 Long Term Monitoring Program*

Sample Name	Well ID	Date	Analyte: Units:	Toluene	trans-1,2- Dichloro ethene	Trichloro ethene	Vinyl chloride	Xylenes, Total
				µg/L	µg/L	µg/L	µg/L	µg/L
MCS for Groundwater				1,000	100	5	2	10,000
33MW5D/GW1	33MW5D	5/30/1997		5 U	5 U	5 U	2 U	NA
33MW5D/GW2	33MW5D	7/16/1998		5 U	5 U	5 U	2 U	NA
33MW5D/GW4	33MW5D	9/26/2007		5 U	5 U	5 U	2 U	0.81 J
33MW05D/GW05	33MW5D	7/2/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW05D/GW06	33MW5D	9/24/2014		1.0 U	1.0 U	1.0 UJ	1.0 U	2.2 U
33MW05D/GW07	33MW5D	12/18/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW05D/GW08	33MW5D	3/13/2015		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW5D / GW01	33MW5D	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW5I/GW2	33MW5I	7/17/1998		5 U	6.19	806 D	12.4	NA
33MW5I/GW4	33MW5I	10/4/2007		25 U	3.7 J	77	66	75 U
33MW05I/GW05	33MW5I	7/2/2014		20 U	4.5 J	13 J	68	45 U
33MW05I/GW06	33MW5I	9/24/2014		10 U	4.1 J	16	80	22 U
33MW05I/GW07	33MW5I	12/18/2014		20 U	3.5 J	6.8 J	100	45 U
33MW05I/GW08	33MW5I	3/13/2015		20 U	4.2 J	34	48	45 U
33MW5I / GW01	33MW5I	12/4/2018		1.0 U	5.0 U	1.0 U	140	1.0 U
33MW5-1000 / GW01 Dup	33MW5I	12/4/2018	Duplicate	1.0 U	5.0 U	1.0 U	130	1.0 U
33MW5S/GW1	33MW5S	5/12/1997		5 U	5 U	279	30.6	NA
33MW5S/GW2	33MW5S	7/17/1998		5 U	5 U	19.2	26.6	NA
33MW5S/GW2D	33MW5S	7/17/1998	Duplicate	5 U	2.96 J	19.6	24.3	NA
33MW5S/GW4	33MW5S	10/4/2007		5 U	5 U	2.4 J	4.1 J	15 U
33MW5S/GW4D	33MW5S	10/4/2007	Duplicate	5 U	0.51 J	3.2 J	4.2 J	15 U
33MW05S/GW05	33MW5S	7/2/2014		1.0 U	0.29 J	1.0 U	1.0 U	2.2 U
33MW05S/GW05D	33MW5S	7/2/2014	Duplicate	1.0 U	0.32 J	1.0 U	1.0	2.2 U
33MW05S/GW06D	33MW5S	9/24/2014	Duplicate	1.0 U	0.23 J	1.0 U	0.71 J	2.2 U
33MW05S/GW06	33MW5S	9/24/2014		1.0 U	0.22 J	1.0 U	0.62 J	2.2 U
33MW05S/GW07D	33MW5S	12/18/2014	Duplicate	1.0 U	0.20 J	1.0 U	0.84 J	2.2 U
33MW05S/GW07	33MW5S	12/18/2014		1.0 U	0.18 J	1.0 U	0.72 J	2.2 U
33MW05S/GW08D	33MW5S	3/13/2015	Duplicate	1.0 U	0.23 J	1.0 U	0.73 J	2.2 U
33MW05S/GW08	33MW5S	3/13/2015		1.0 U	0.24 J	1.0 U	0.70 J	2.2 U
33MW5S / GW01	33MW5S	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW6D/DW1	33MW6D	4/17/1997		5 U	5 U	5 U	60.9	NA
33MW6D/GW1	33MW6D	5/30/1997		5 U	5 U	5 U	2 U	NA
33MW6D/GW2	33MW6D	7/15/1998		5 U	5 U	5 U	2 U	NA
33MW6D/GW3	33MW6D	2/2/2001		1 U	1 U	1 U	1 U	2.4 U
33MW6D/GW4	33MW6D	10/1/2007		5 U	5 U	5 U	2 U	10 U
33MW06D/GW05	33MW6D	7/1/2014		1.0 U	1.0 U	1.0 U	0.39 J	2.2 U
33MW06D/GW06	33MW6D	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW06D/GW07	33MW6D	12/17/2014		1.0 U	1.0 U	1.0 U	0.31 J	2.2 U
33MW06D/GW08	33MW6D	3/12/2015		1.0 U	1.0 U	1.0 U	0.35 J	2.2 U
33MW6D / GW01	33MW6D	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

**Table D-1**  
**VOC Analytical Results - All Events**  
 SWMU 33 Long Term Monitoring Program

Sample Name	Well ID	Date	Analyte: Units:	1,1,1- Trichloro ethane	1,1,2- Trichloro ethane	1,1- Dichloro ethane	1,1- Dichloro ethene	1,2- Dichloro ethane	1,2- Dichloro ethene	Acetone	Benzene	Carbon disulfide	Chloroform	cis-1,2- Dichloro ethene	Ethyl benzene	Methylene chloride	Tetra chloro ethene
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
<b>MCS for Groundwater</b>				<b>200</b>	<b>5</b>	<b>2.7</b>	<b>7</b>	<b>5</b>	<b>130</b>	<b>14,000</b>	<b>5</b>	<b>810</b>	<b>80</b>	<b>70</b>	<b>700</b>	<b>5</b>	<b>5</b>
33MW7D/GW1	33MW7D	5/12/1997		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW7D/GW2	33MW7D	7/16/1998		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW7D/GW3	33MW7D	2/2/2001		1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U
33MW7D/GW4	33MW7D	10/1/2007		5 U	5 U	5 U	5 U	5 U	NA	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW07D/GW05	33MW7D	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW07D/GW06	33MW7D	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW07D/GW07	33MW7D	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW07D/GW08	33MW7D	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	<b>16</b>	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW7D / GW01	33MW7D	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW7S/GW1	33MW7S	5/12/1997		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW7S/GW2	33MW7S	7/16/1998		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW7S/GW3	33MW7S	2/2/2001		1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U
33MW7S/GW4	33MW7S	10/1/2007		5 U	5 U	5 U	5 U	5 U	NA	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW07S/GW05	33MW7S	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW07S/GW06	33MW7S	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW07S/GW07	33MW7S	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW07S/GW08	33MW7S	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW7S / GW01	33MW7S	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW8S/GW1	33MW8S	5/12/1997		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	<b>10.5</b>	5 U	5 U	5 U
33MW8S/GW2	33MW8S	7/16/1998		5 U	5 U	<b>4.63 J</b>	<b>3.14 J</b>	5 U	NA	100 U	5 U	5 U	5 U	<b>12.2</b>	5 U	5 U	5 U
33MW8S/GW4	33MW8S	10/4/2007		5 U	5 U	<b>4.4 J</b>	<b>1.7 J</b>	5 U	NA	25 U	1 U	5 U	5 U	<b>33</b>	5 U	5 U	5 U
33MW08S/GW05	33MW8S	7/2/2014		2.0 U	2.0 U	<b>6.1</b>	<b>1.1 J</b>	2.0 U	NA	20 U	2.0 U	4.0 U	2.0 U	<b>76</b>	2.0 U	4.0 U	2.0 U
33MW08S/GW06	33MW8S	9/23/2014		2.0 U	2.0 U	<b>6.5</b>	<b>0.98 J</b>	2.0 U	NA	20 U	2.0 U	4.0 U	2.0 U	<b>64</b>	2.0 U	4.0 U	2.0 U
33MW08S/GW07	33MW8S	12/17/2014		4.0 U	4.0 U	<b>8.8</b>	<b>4.0 U</b>	4.0 U	NA	40 U	4.0 U	8.0 U	4.0 U	<b>79</b>	4.0 U	8.0 U	4.0 U
33MW08S/GW08	33MW8S	3/12/2015		2.0 U	2.0 U	<b>8.7</b>	<b>0.95 J</b>	2.0 U	NA	20 U	2.0 U	4.0 U	2.0 U	<b>77</b>	2.0 U	4.0 U	2.0 U
33MW8S / GW01	33MW8S	12/5/2018		1.0 U	1.0 U	<b>9.5</b>	1.0 U	1.0 U	<b>79</b>	2.0 U	1.0 U	2.0 U	1.0 U	<b>78</b>	1.0 U	2.0 U	1.0 U
33MW8-1000 / GW01 Dup	33MW8S	12/5/2018	Duplicate	1.0 U	1.0 U	<b>9.9</b>	1.0 U	1.0 U	<b>85</b>	2.0 U	1.0 U	2.0 U	1.0 U	<b>83</b>	1.0 U	2.0 U	1.0 U
33MW10D/GW2	33MW10D	7/14/1998		5 U	5 U	<b>4.32 J</b>	5 U	5 U	NA	100 U	5 U	5 U	5 U	<b>74.4</b>	5 U	5 U	5 U
33MW10D/GW2	33MW10D	9/21/1998		5 U	5 U	<b>2.9 J</b>	<b>2.2 J</b>	5 U	<b>65</b>	5 U	5 U	5 U	5 U	<b>63</b>	5 U	5 U	5 U
33MW10D/GW3	33MW10D	2/1/2001		1 U	1 U	<b>1.5</b>	1 U	1 U	NA	NA	1 U	NA	1 U	<b>14</b>	1 U	1 U	1 U
33MW10D/GW3D	33MW10D	2/1/2001	Duplicate	1 U	1 U	<b>1.6</b>	1 U	1 U	NA	NA	1 U	NA	1 U	<b>14</b>	1 U	1 U	1 U
33MW10D/GW3QA	33MW10D	2/1/2001		1 U	1 U	<b>1.2</b>	1 U	1 U	NA	NA	1 U	NA	1 U	<b>11.3</b>	1 U	1 U	1 U
33MW10D/GW4QA	33MW10D	10/3/2007		1 U	1 U	1 U	1 U	1 U	NA	25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
33MW10D/GW4	33MW10D	10/3/2007		5 U	5 U	5 U	5 U	5 U	NA	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW10D/GW4D	33MW10D	10/3/2007	Duplicate	5 U	5 U	5 U	5 U	5 U	NA	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW10D/GW05	33MW10D	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10D/GW05D	33MW10D	7/1/2014	Duplicate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10D/GW06D	33MW10D	9/23/2014	Duplicate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10D/GW06	33MW10D	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10D/GW07D	33MW10D	12/17/2014	Duplicate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10D/GW07	33MW10D	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10D/GW08D	33MW10D	3/12/2015	Duplicate	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10D/GW08	33MW10D	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U

**Table D-1**  
**VOC Analytical Results - All Events**  
*SWMU 33 Long Term Monitoring Program*

Sample Name	Well ID	Date	Analyte: Units:	Toluene	trans-1,2- Dichloro ethene	Trichloro ethene	Vinyl chloride	Xylenes, Total
				µg/L	µg/L	µg/L	µg/L	µg/L
MCS for Groundwater				1,000	100	5	2	10,000
33MW7D/GW1	33MW7D	5/12/1997		5 U	5 U	5 U	2 U	NA
33MW7D/GW2	33MW7D	7/16/1998		5 U	5 U	5 U	2 U	NA
33MW7D/GW3	33MW7D	2/2/2001		1 U	1 U	1 U	1 U	2.4 U
33MW7D/GW4	33MW7D	10/1/2007		5 U	5 U	5 U	2 U	10 U
33MW07D/GW05	33MW7D	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW07D/GW06	33MW7D	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW07D/GW07	33MW7D	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW07D/GW08	33MW7D	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW7D / GW01	33MW7D	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW7S/GW1	33MW7S	5/12/1997		5 U	5 U	5 U	2 U	NA
33MW7S/GW2	33MW7S	7/16/1998		5 U	5 U	5 U	2 U	NA
33MW7S/GW3	33MW7S	2/2/2001		1 U	1 U	1 U	1 U	2.4 U
33MW7S/GW4	33MW7S	10/1/2007		5 U	5 U	5 U	2 U	10 U
33MW07S/GW05	33MW7S	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW07S/GW06	33MW7S	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW07S/GW07	33MW7S	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW07S/GW08	33MW7S	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW7S / GW01	33MW7S	12/4/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW8S/GW1	33MW8S	5/12/1997		5 U	5 U	26	2 U	NA
33MW8S/GW2	33MW8S	7/16/1998		5 U	5 U	51.7	2 U	NA
33MW8S/GW4	33MW8S	10/4/2007		5 U	5 U	130	0.89 J	15 U
33MW08S/GW05	33MW8S	7/2/2014		2.0 U	1.0 J	79	0.62 J	4.5 U
33MW08S/GW06	33MW8S	9/23/2014		2.0 U	1.1 J	56	0.40 J	4.5 U
33MW08S/GW07	33MW8S	12/17/2014		4.0 U	1.2 J	45	0.44 J	8.9 U
33MW08S/GW08	33MW8S	3/12/2015		2.0 U	1.1 J	40	0.34 J	4.5 U
33MW8S / GW01	33MW8S	12/5/2018		1.0 U	1.6	39	1.0 U	1.0 U
33MW8-1000 / GW01 Dup	33MW8S	12/5/2018	Duplicate	1.0 U	1.7	42	1.0 U	1.0 U
33MW10D/GW2	33MW10D	7/14/1998		5 U	5 U	5 U	9.05	NA
33MW10D/GW2	33MW10D	9/21/1998		5 U	5 U	5 U	4.1	NA
33MW10D/GW3	33MW10D	2/1/2001		1 U	1.1	1 U	22	2.4 U
33MW10D/GW3D	33MW10D	2/1/2001	Duplicate	1 U	1	1 U	22	2.4 U
33MW10D/GW3QA	33MW10D	2/1/2001		1 U	1 U	1 U	16.4	3 U
33MW10D/GW4QA	33MW10D	10/3/2007		1 U	1 U	1 U	0.8 J	3 U
33MW10D/GW4	33MW10D	10/3/2007		5 U	5 U	5 U	2 U	10 U
33MW10D/GW4D	33MW10D	10/3/2007	Duplicate	5 U	5 U	5 U	0.88 J	10 U
33MW10D/GW05	33MW10D	7/1/2014		1.0 U	1.0 U	1.0 U	0.41 J	2.2 U
33MW10D/GW05D	33MW10D	7/1/2014	Duplicate	1.0 U	1.0 U	1.0 U	0.34 J	2.2 U
33MW10D/GW06D	33MW10D	9/23/2014	Duplicate	1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW10D/GW06	33MW10D	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW10D/GW07D	33MW10D	12/17/2014	Duplicate	1.0 U	1.0 U	1.0 U	0.94 J	2.2 U
33MW10D/GW07	33MW10D	12/17/2014		1.0 U	1.0 U	1.0 U	1.1	2.2 U
33MW10D/GW08D	33MW10D	3/12/2015	Duplicate	1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW10D/GW08	33MW10D	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U

**Table D-1**  
**VOC Analytical Results - All Events**  
 SWMU 33 Long Term Monitoring Program

Sample Name	Well ID	Date	Analyte: Units:	1,1,1- Trichloro ethane	1,1,2- Trichloro ethane	1,1- Dichloro ethane	1,1- Dichloro ethene	1,2- Dichloro ethane	1,2- Dichloro ethene	Acetone µg/L	Benzene µg/L	Carbon disulfide µg/L	Chloroform µg/L	cis-1,2- Dichloro ethene	Ethyl benzene	Methylene chloride	Tetra chloro ethene
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					µg/L	µg/L	µg/L	µg/L
<b>MCS for Groundwater</b>				<b>200</b>	<b>5</b>	<b>2.7</b>	<b>7</b>	<b>5</b>	<b>130</b>	<b>14,000</b>	<b>5</b>	<b>810</b>	<b>80</b>	<b>70</b>	<b>700</b>	<b>5</b>	<b>5</b>
33MW10S/GW2	33MW10S	7/14/1998		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW10S/GW3	33MW10S	2/1/2001		1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U
33MW10S/GW4QA	33MW10S	10/3/2007		1 U	1 U	1 U	1 U	1 U	NA	25 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
33MW10S/GW4	33MW10S	10/3/2007		5 U	5 U	5 U	5 U	5 U	NA	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW10S/GW05	33MW10S	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10S/GW06	33MW10S	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10S/GW07	33MW10S	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW10S/GW08	33MW10S	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW11D/GW2	33MW11D	7/14/1998		5 U	5 U	<b>2.92 J</b>	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW11D/GW3	33MW11D	2/1/2001		1 U	1 U	<b>1.8</b>	1 U	1 U	NA	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U
33MW11D/GW4	33MW11D	10/4/2007		5 U	5 U	5 U	5 U	5 U	NA	25 U	1 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW11D/GW05	33MW11D	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW11D/GW06	33MW11D	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW11D/GW07	33MW11D	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW11D/GW08	33MW11D	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	<b>18 J</b>	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW11D / GW01	33MW11D	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	<b>3.0</b>	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW11S/GW2	33MW11S	7/14/1998		5 U	5 U	5 U	5 U	5 U	NA	100 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW11S/GW3	33MW11S	2/1/2001		1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U
33MW11S/GW4	33MW11S	9/27/2007		5 U	5 U	5 U	5 U	5 U	NA	10 U	<b>0.46 J</b>	5 U	5 U	<b>2.3 J</b>	<b>0.65 J</b>	5 U	5 U
33MW11S/GW05	33MW11S	7/1/2014		1.0 U	1.0 U	<b>0.87 J</b>	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>0.21 J</b>	1.0 U	2.0 U	1.0 U
33MW11S/GW06	33MW11S	9/23/2014		1.0 U	1.0 U	<b>0.40 J+</b>	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>0.22 J+</b>	1.0 U	2.0 U	1.0 U
33MW11S/GW07	33MW11S	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	1.0 JU	1.0 U	2.0 U	1.0 U
33MW11S/GW08	33MW11S	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	<b>22 J</b>	1.0 U	2.0 U	1.0 U	1.0 JU	1.0 U	2.0 U	1.0 U
33MW11S / GW01	33MW11S	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW16D/GW4	33MW16D	10/3/2007		5 U	5 U	5 U	5 U	5 U	NA	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW16D/GW05	33MW16D	6/30/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>0.19 J</b>	1.0 U	2.0 U	1.0 U
33MW16D/GW06	33MW16D	9/22/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>0.17 J</b>	1.0 U	2.0 U	1.0 U
33MW16D/GW07	33MW16D	12/16/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>0.20 J</b>	1.0 U	2.0 U	1.0 U
33MW16D/GW08	33MW16D	3/11/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 JU	1.0 U	2.0 U	1.0 U
33MW16D / GW01	33MW16D	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW16S/GW4	33MW16S	10/2/2007		5 U	5 U	5 U	5 U	5 U	NA	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
33MW16S/GW05	33MW16S	6/30/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 JU	1.0 U	2.0 U	1.0 U	<b>0.22 J</b>	1.0 U	2.0 U	1.0 U
33MW16S/GW06	33MW16S	9/22/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>0.20 J</b>	1.0 U	2.0 U	1.0 U
33MW16S/GW07	33MW16S	12/16/2014		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	<b>0.24 J</b>	1.0 U	2.0 U	1.0 U
33MW16S/GW08	33MW16S	3/11/2015		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	10 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
33MW16S / GW01	33MW16S	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U

**Bold** - Parameter was detected.  
**Shaded** - Result exceeded MCS.  
 µg/L - micrograms per liter  
 MCS - media cleanup standard  
 J - Qualified as estimated.  
 J+ - Qualified as an estimated value, biased high.  
 NA - not analyzed  
 U - Not Detected. Value is the reporting limit.  
 UJ - Not Detected. Reporting limit is an estimated value.

**Table D-1**  
**VOC Analytical Results - All Events**  
*SWMU 33 Long Term Monitoring Program*

Sample Name	Well ID	Date	Analyte: Units:	Toluene	trans-1,2- Dichloro ethene	Trichloro ethene	Vinyl chloride	Xylenes, Total
				µg/L	µg/L	µg/L	µg/L	µg/L
MCS for Groundwater				1,000	100	5	2	10,000
33MW10S/GW2	33MW10S	7/14/1998		5 U	5 U	5 U	2 U	NA
33MW10S/GW3	33MW10S	2/1/2001		1 U	1 U	1 U	1 U	2.4 U
33MW10S/GW4QA	33MW10S	10/3/2007		1 U	1 U	1 U	1 U	3 U
33MW10S/GW4	33MW10S	10/3/2007		5 U	5 U	5 U	2 U	10 U
33MW10S/GW05	33MW10S	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW10S/GW06	33MW10S	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW10S/GW07	33MW10S	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW10S/GW08	33MW10S	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW11D/GW2	33MW11D	7/14/1998		5 U	5 U	5 U	2 U	NA
33MW11D/GW3	33MW11D	2/1/2001		1 U	1 U	1 U	1 U	2.4 U
33MW11D/GW4	33MW11D	10/4/2007		5 U	5 U	5 U	5 U	15 U
33MW11D/GW05	33MW11D	7/1/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW11D/GW06	33MW11D	9/23/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW11D/GW07	33MW11D	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW11D/GW08	33MW11D	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW11D / GW01	33MW11D	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW11S/GW2	33MW11S	7/14/1998		5 U	5 U	5 U	2 U	NA
33MW11S/GW3	33MW11S	2/1/2001		1 U	1 U	1 U	1 U	2.4 U
33MW11S/GW4	33MW11S	9/27/2007		5 U	5 U	<b>1.8 J</b>	2 U	<b>0.86 J</b>
33MW11S/GW05	33MW11S	7/1/2014		1.0 U	1.0 U	<b>0.46 J</b>	1.0 U	2.2 U
33MW11S/GW06	33MW11S	9/23/2014		1.0 U	1.0 U	<b>0.34 J+</b>	1.0 U	2.2 U
33MW11S/GW07	33MW11S	12/17/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW11S/GW08	33MW11S	3/12/2015		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW11S / GW01	33MW11S	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW16D/GW4	33MW16D	10/3/2007		5 U	5 U	5 U	2 U	10 U
33MW16D/GW05	33MW16D	6/30/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW16D/GW06	33MW16D	9/22/2014		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW16D/GW07	33MW16D	12/16/2014		1.0 U	1.0 U	1.0 U	<b>0.14 J</b>	2.2 U
33MW16D/GW08	33MW16D	3/11/2015		1.0 U	1.0 U	1.0 U	1.0 U	2.2 U
33MW16D / GW01	33MW16D	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
33MW16S/GW4	33MW16S	10/2/2007		5 U	5 U	5 U	2 U	10 U
33MW16S/GW05	33MW16S	6/30/2014		1.0 U	1.0 U	<b>0.39 J</b>	1.0 U	2.2 U
33MW16S/GW06	33MW16S	9/22/2014		1.0 UJ	1.0 U	<b>0.43 J</b>	1.0 U	2.2 U
33MW16S/GW07	33MW16S	12/16/2014		1.0 U	1.0 U	<b>0.39 J</b>	1.0 U	2.2 U
33MW16S/GW08	33MW16S	3/11/2015		1.0 U	1.0 U	1.0 JU	1.0 U	2.2 U
33MW16S / GW01	33MW16S	12/5/2018		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

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